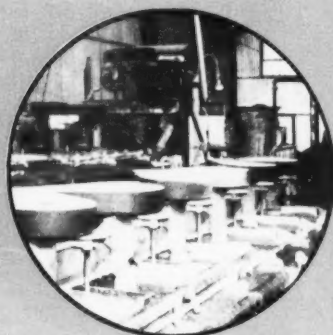


MINING WORLD



in this issue

Kaiser Floats Nevada Fluorspar

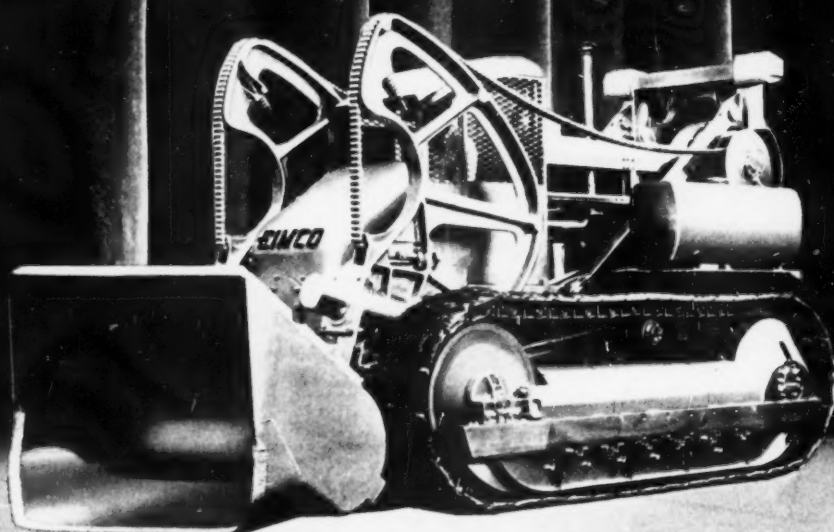
Page 38



EIMCO 105, the world's finest tractor-loader will reduce loading costs and increase production. This revolutionary new machine provides instant reversal at all speeds, shifting under full load in motion and clutches that never need adjustment. Write.

THE EIMCO CORPORATION

Salt Lake City, Utah, U.S.A.
Export Office: Rimee Bldg., 32 South St., New York City



NOVEMBER 1953

Vol. 15 No. 12

35 cents a copy
in sterling 3s

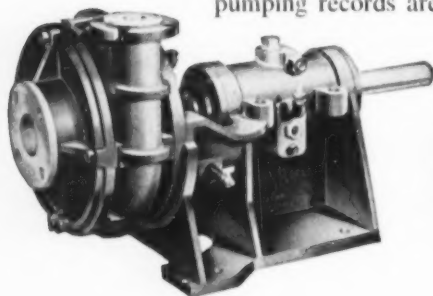
an A-S-H pump to fit

**your
abrasive pulp
handling
need**

HYDROSEAL

**for maximum head and
ability to work in series**

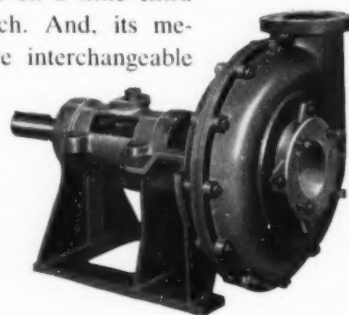
A little sealing water goes a long way in Hydroseals toward cutting your costs in power and in maintenance. You save $\frac{1}{3}$ to $\frac{1}{2}$ in power. And, million-ton-plus pumping records are common.



CENTRISEAL

**for pumping
without seal-water**

This pump gives top-level performance where even a little extra water is too much. And, its mechanical parts are interchangeable with Hydroseals.



See the
CENTRISEAL
at the
Chemical Show

Philadelphia—Nov. 30-Dec. 1
Booth C-119

Of the A-S-H pumps sold last year, 73% were specified by engineers who already had our pumps in service. When you see what Hydroseals or Centriseals will do for you, you'll be sending repeat orders, too.

THE ALLEN-SHERMAN-HOFF PUMP CO.

Dept. J—259 E. Lancaster Ave., Wynnewood, Pa.

Representatives throughout the World

HYDROSEAL

and CENTRISEAL

SAND, SLURRY & DREDGE PUMPS

MAXIMIX RUBBER PROTECTED



YOU get more for your money than just a tractor!

WHEN you buy a piece of Cat* equipment, you think of a lot of other things besides tough steel and yellow paint. Things you can't see or feel or touch, but that will help you make *more money this year—and year after year!*

You *know*, for instance, that you can count on profitable production because your equipment will keep you on schedule. Its stamina, *plus* on-the-spot service from your Caterpillar Dealer, cuts down time to the minimum.

You *know* the bank will give you better financing on big yellow machines because of their reputation.

You *know* there are no "orphans" in the line. You can work Caterpillar machines profitably for years and *always* get parts for them—at the standard low list price.

You *know* that day after day, week after week, month after month, they will do *more* work with *less* down time at *lower* cost than any competitive units.

And, finally, you *know* that when you're ready to trade in a Cat machine you'll get more money for it—the *top* resale value in the field.

Getting ready to buy mining units? Fine. Look them all over. *But look at their last cost first.* Remember what you *know* about Caterpillar!

Caterpillar Tractor Co., San Leandro, Cal.; Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—(C)

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Lower End "C" Lower End "B" Lower End "A"

Longyear

"L" SERIES DOUBLE TUBE CORE BARRELS

with interchangeable lower ends

The Choice of Operators for Dependability and Economy

... Cores
Tell
The Story

INTERCHANGEABLE FOR SOLID FORMATIONS
Consists of a split ring core lifter and case, an inner tube extension, and a bit. It is especially adaptable for use with the swivel type core barrel heads in reasonably solid formations.

INTERCHANGEABLE FOR BROKEN FORMATIONS
This is a basket type core lifter, an inner tube extension, and a bit. It should be used only with swivel type core barrel heads. It is the preferred choice for coring clay or badly broken formations.

INTERCHANGEABLE FOR DRY BLOCKING
Designed to assure longer runs in formations where core lifter resistance causes premature blocking. This assembly does not have any core lifter but has a straight wall inner tube shoe extending down to the bit. This is highly recommended when dry blocking is used.

Interchangeable feature assures quick conversion to meet changing field conditions

LARGE SERIES Ball Bearing Swivel Type Double Tube Core Barrels

The large series core barrels are unexcelled for shallow exploration in soft formations, mine drilling, and foundation test boring on embankments, and on slopes and on sites for heavy structures. Let us send you complete details.

The "L" Series of Double Tube Core Barrels has been designed and developed to increase and improve core recovery in ground that is difficult to core with ordinary equipment. These core barrels are especially suitable for use in broken, fissured, porous and easily eroded formations.

This series adds new and desirable features in a design which allows for quick conversion to meet changing field conditions, and which have many proven advantages to the operator. Let Longyear engineers help you select the proper equipment for your needs.

Write today for bulletin containing full details and specifications.

In U.S.A.
L. J. LONGYEAR COMPANY
Minneapolis 2, Minn.

Longyear

In Canada
CANADIAN LONGYEAR LTD.
North Bay, Ontario

**DIAMOND CORE DRILLS • CONTRACT CORE DRILLING
GEOLOGICAL AND MINING ENGINEERS AND CONSULTANTS**

REPRESENTATIVES IN PRINCIPAL MINING CENTERS OF THE WORLD

GRAB SAMPLES From the Mail

Hope Bill Not Liked

Dear Sir:

With respect to the Capitol Concentrates item titled "What's Next!" which appeared on page 36 of the August issue of MINING WORLD, I say "I do not like it."

For years the mining people have been so engrossed in their own affairs that they have allowed a Bureaucracy to develop which now threatens to engulf them. Such as that of Congressman Clifford Hope of Kansas and his bill H. R. 5358.

I hold no promise with those people who would take advantage of present mineral laws to build summer cottages etc. on the pretense of mineral discovery. Such instances do not cover an extensive part of the public domain and such situations can be dealt with properly.

The invasion of the rights of the mineral hunter should not be restricted on any Public lands whether covered by the national forests or lands held by the cattle men—of course, within due bounds of a legal nature, such as annual assessment work etc.

There are no mines in the United States that were not at one time a prospect. A hole dug in the ground by some one that had faith. Not in all cases was the faith rewarded, but out of all the failures, once in a while, a mine developed.

No great restrictions should be placed on a man willing to venture forth in a legitimate attitude to gain wealth by trying to find a mine, or what might develop into a mine.

He needs assistance, not restrictions.

We hope that Mr. Clifford Hope's H. R. 5358 will find its final resting place outside of his restrictive ambitions.

L. M. Richard
Rome, Georgia.

Accurate and Practical

Dear Sir:

Having had the opportunity to enjoy lengthy stays in such countries as western and eastern Europe, Turkey, Algeria, Tunisia, Morocco, Brazil, etc. and still being in contact with some of these countries, I believe I am sufficiently informed to appreciate the accuracy and practical importance of the news gathered and printed by World Mining.

I will certainly read this publication in the future and will be pleased to show it around as a source of reliable information.

P. R. Jeffrey
Val d'Or, Quebec,
Canada.

MINING WORLD

Including the Export Edition WORLD MINING

Published monthly except in April when publication is semi-monthly

VOLUME 15

NOVEMBER 1953

NUMBER 12

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COVER CIRCLE: Kaiser Aluminum and Chemical Corporation uses two banks of eight No. 18 special Denver "Sub A" flotation cells to make an acid grade fluorspar concentrate at its Fallon, Nevada mill.

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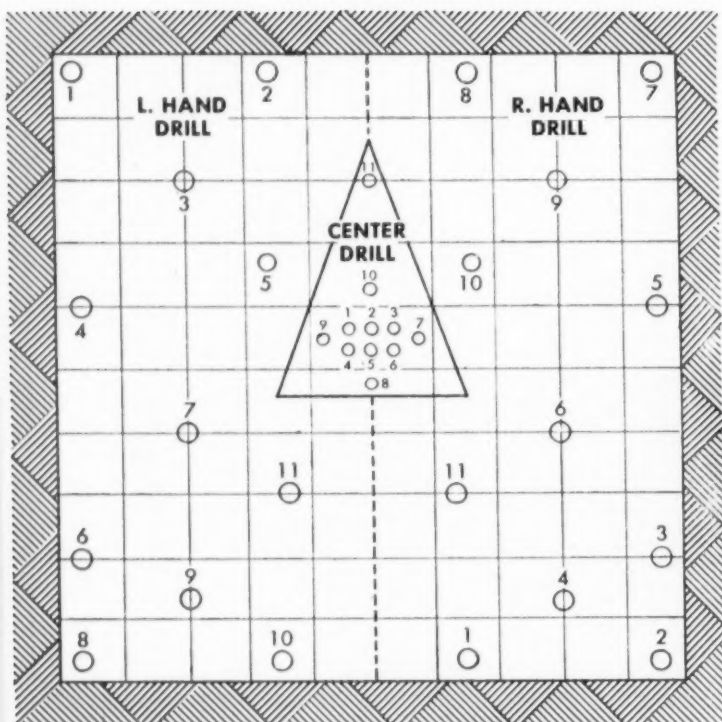
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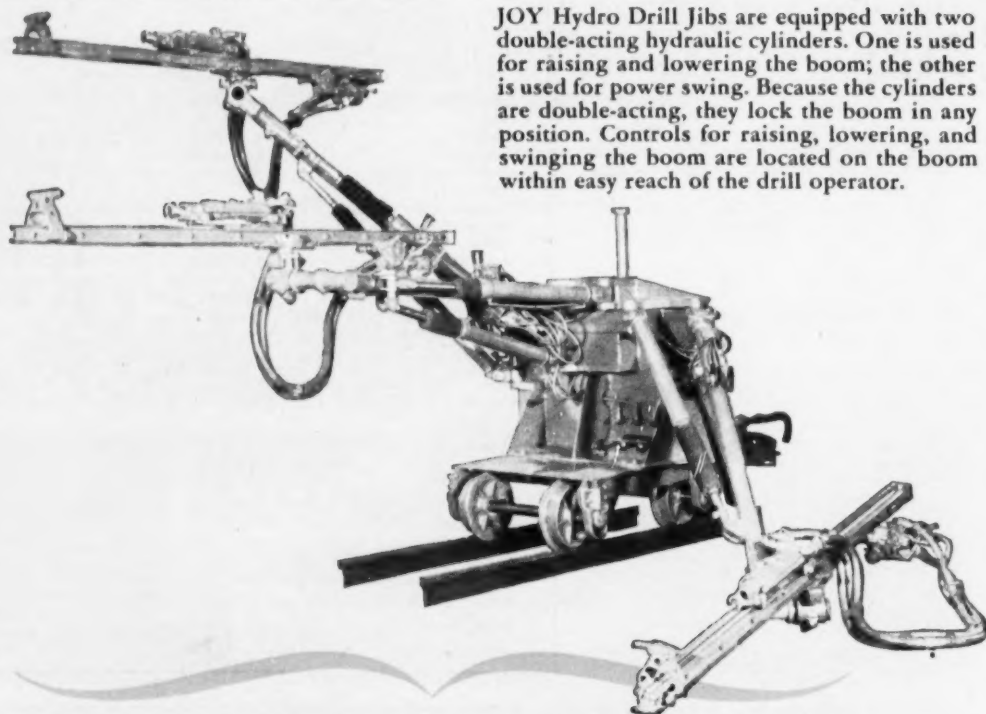
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"DRILL OUT THIS ROUND"

said the Joy Engineer.



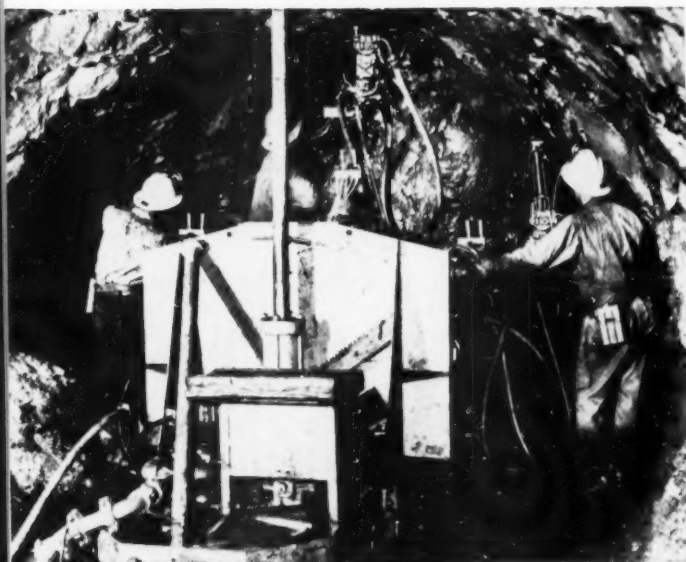
MAXIMUM VERTICAL RANGE WITH
VARIOUS LENGTH BOOMS: 10 to 14 FEET



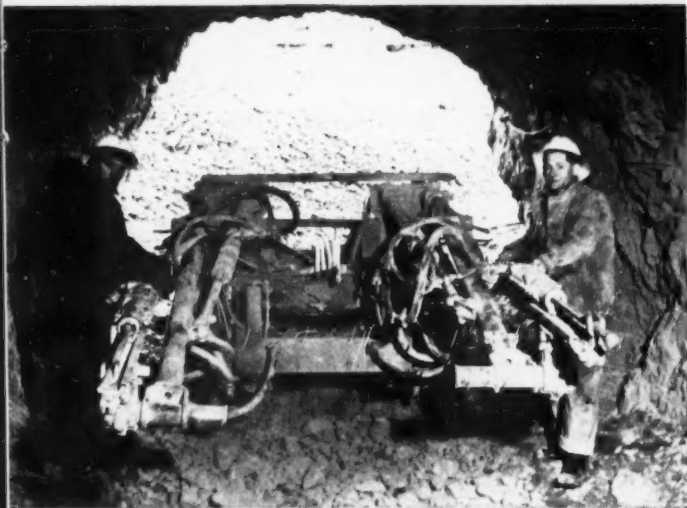
JOY Hydro Drill Jibs are equipped with two double-acting hydraulic cylinders. One is used for raising and lowering the boom; the other is used for power swing. Because the cylinders are double-acting, they lock the boom in any position. Controls for raising, lowering, and swinging the boom are located on the boom within easy reach of the drill operator.

MAXIMUM LATERAL RANGE WITH VARIOUS LENGTH BOOMS: 18 to 28 FEET

.. "IN RECORD TIME and WITH LESS EFFORT with JOY HYDRO DRILL JIBS"



On the job in a heading: a JOY Jib Jumbo mounting three Hydro Drill Jibs with JOY T-300 drifters.



JOY builds a complete line of Jib Jumbos and Drillmobiles. Above: a twin-boom JOY Drillmobile, rubber-tired and self-propelled for quick, easy mobility.

The recommendation above was made by one of Joy's drill mechanization specialists. He made it to a mining company which is now a satisfied user of the equipment recommended: four Joy Jib Jumbos (see facing page) each mounting three Joy T-300 Drifters on LW-6A long chain feeds. He went on to say—

"The LW 6A feed, easily supported by the Hydro Drill Jib, has an overall travel of 8 feet with a steel change of 6 feet. Thus, the proposed round can be drilled with one length of steel."

He then proposed and fully explained a drilling pattern (again see facing page) for a 10' x 10' round, showing the location of the eleven holes to be drilled by each one of the three jib-mounted drills. Basically, the plan provided for the least interference, and the maximum amount of drilling without dumping or swinging the drills. The holes for each drill were numbered so that the spreads between gave the runners plenty of working room. He closed by saying—

"The purpose of this proposal is to describe the many advantages of Joy fully automatic Hydro Drill Jibs. Joy pioneered the hydraulic drill jib and is still maintaining the lead in the design of this type of rig. We are keeping ahead with sound, practical improvements, and today believe we produce the finest drilling equipment available."

• Why not let a Joy drill mechanization specialist look over your problem and solve it the way he did this one? Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.



Consult a Joy Engineer

JOY

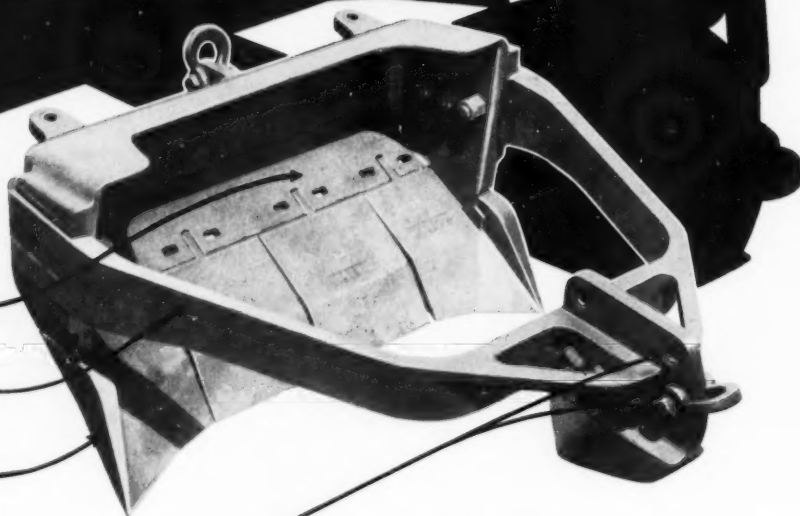
WORLD'S LARGEST MANUFACTURER OF
UNDERGROUND MINING EQUIPMENT

Proved by Performance!

Pacific

SLUSHMASTER SCRAPERS

U.S.A. and Foreign Patents Applied For



LOW CENTER OF GRAVITY ★

Weight is concentrated over blades and side cutters.

HARNESS DESIGN ★

Acts as curved bumper to by-pass obstructions.

POSITIVE DIGGING ACTION ★

Blade and side cutter design of "Slush-master" is such that all models will immediately secure a load in a single pass, regardless of size or type of material or slope of muck pile.

ADJUSTABLE DIGGING ANGLE ★

Shackle may be changed to different locations on shoe. 2 or 3 holes are provided, depending on size of scraper.

EASY DISASSEMBLY ★

Can be taken down into four parts. Easy to move into any working place.

USERS SAY:

"You have to see 'em work to believe it,"...

"It's the 'slushing' bucket I've ever seen,"...

"Best breast cleaning scraper ever designed,"...

"First scraper I ever saw that is a REAL scraper."

OUTSTANDING FEATURES:

Streamlined design. Rugged construction throughout. Simplified method of attaching blades and side cutters... change them in 15 minutes underground. Special Alloy Steel blades and side cutters designed for maximum toughness and wear resistance. Complete line - nine different models from 26" to 60" widths - 398 lbs. to 2275 lbs. Send for Bulletin No. 215.

ALLOY STEEL & METALS CO.

1848 EAST 55TH STREET, LOS ANGELES 58, CALIFORNIA

Mailing address: Box 15323 Vernon Station, Los Angeles 58, California

BE SPECIFIC—ORDER PACIFIC

For added efficiency, use Pacific Sheave Blocks, Sheave Anchors, "Round-The-Corner" Sheave Blocks, Jaw Crushers, Bit Knockers and Pacific Wearing Parts.

**ALLOY
STEEL &
METALS
CO.**



**ore cars
really keep
rolling
on**

AMSCO

manganese steel wheels

five years continuous service without replacement

Five years ago a mining company equipped thirty ten-ton ore cars with Amsco Manganese Steel wheels. Not one has had to be replaced because of wear or breakage! Here is why Amsco products made of Manganese Steel, "the toughest steel known," lasts:

- 1** Work-hardens under impact to as high as 450-550 Brinell.
- 2** Surface polishes to reduce wear and minimize lubrication.
- 3** 12 to 14 percent Manganese for strength and ductility.

*and it's easily weldable with
Amsco Hardfacing Alloys*

Write Amsco or ask your ore car builder for information on how Amsco Manganese Steel wheels can help you keep production rolling.



AMERICAN MANGANESE STEEL DIVISION

425 East 14th Street • Chicago Heights, Ill. OTHER PLANTS: NEW CASTLE, DEL., DENVER, OAKLAND, CAL., LOS ANGELES, ST. LOUIS. IN CANADA: JOLIETTE STEEL DIVISION, JOLIETTE, QUE. AMSCO WELDING PRODUCTS DISTRIBUTED IN CANADA BY CANADIAN LIQUID AIR CO., LTD.

NOVEMBER, 1953

{World Mining Section—7}

Modern methods speed opening

SINCE the end of World War II, modernization has reached into many fields of the Turkish economy. New airports and roads have been built, factories erected, and new mines opened. With this stepped-up economy, the search for vitally-needed coal, too, has spread.

One important development is at Kozlu, on the Black Sea. Here Eregli Coal Fields Exploitation, of Zonguldak, is sinking several shafts to reach extended underground bituminous deposits. Perhaps the busiest unit on their project is a 4-wheel rubber-tired Tournatractor with dozer blade.

1 Tournatractor replaces 2 crawler-tractors and 1 grader

With its faster than crawler-tractor speeds, 19 mph (30 km/h.) instead of 3 to 6 mph (5 to 8 km/h.), Tournatractor handles many widely-scattered maintenance assignments. Its primary task is maintaining 2 areas where ma-



terial excavated from the new mine shafts is dumped. To handle this work, Tournatractor shuttles 6/10 of a mile (1 km.) between the dumps and levels all the muck, rock and shale hauled to the 2 locations by *eight* 22-yd. (16 m³) capacity trucks. This fast rubber-tired tractor also grades 3 1/2 miles

(2 1/4 kilometers) of haul road twice a day. In spare time, it cleans spillage from around the mine shafts. Mine officials report that the *one* Tournatractor does the same amount of work on all these tasks as did the *two* track-type tractors and the *one* motor patrol it replaced.

Tires reduce maintenance costs

Most of this increased efficiency is the result of using tires instead of tracks. Tournatractor can travel at 19 mph (30 km/h.) as well as work at higher speed than a crawler-tractor. With tires, there is no need for expensive repairs or the time-consuming lubrication necessary with the 400 to 500 parts of an average track assembly.

You can obtain similar efficiencies and lower equipment costs on your mine exploration and development program. Let us help you check Tournatractor savings. Units are available for dollars or pounds sterling.



of new coal mine in Turkey



Tournatractor levels muck at dump area located on the shore of the Black Sea. With big tires and 186 hp, unit has plenty of traction to work in the slick material. When dump has been brought up to level, it will be used as a storage area for mine timber supports.

Leveling present timber storage area, Tournatractor dozes earth and rock. Unit later will spread loose fine earth over the rough rock to provide a smooth level working space.

Tournatractor makes cut along base of cliff to build haul road to new dump area. Blade carries $2\frac{1}{2}$ cubic yards (1.9 cubic meters) of material per pass.



Tournatractor—Trademark D-326-M



LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

ALLIS-CHALMERS GRINDING MILLS

SPIRAL LINERS make grinding MORE PROFITABLE

INCREASED CIRCULATING LOAD ... LESS OVERGRINDING ...

Material is kept on the move. Large balls do not overgrind fine particles needlessly. Percentage of circulating load has been *tripled* on several mills equipped with spiral liners!

EFFECTIVE BALL SEGREGATION

Large balls at feed end break large particles of incoming feed. Small balls concentrate at discharge end where they utilize greater ball surface for grinding smaller particles.

SIMPLIFIED FEEDING

Ball charge does not fight incoming feed. Motion imparted to balls and material by spiral liners results in a low level of balls at feed end and a higher level at discharge end.

INCREASED CAPACITY

More material can be put through mill in a given time. Retention time of material in the mill is reduced. Power cost is less — no power is wasted on overgrinding . . . ball segregation increases efficiency.

For application of spiral liners to your grinding mill, call the Allis-Chalmers representative in your area, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4155

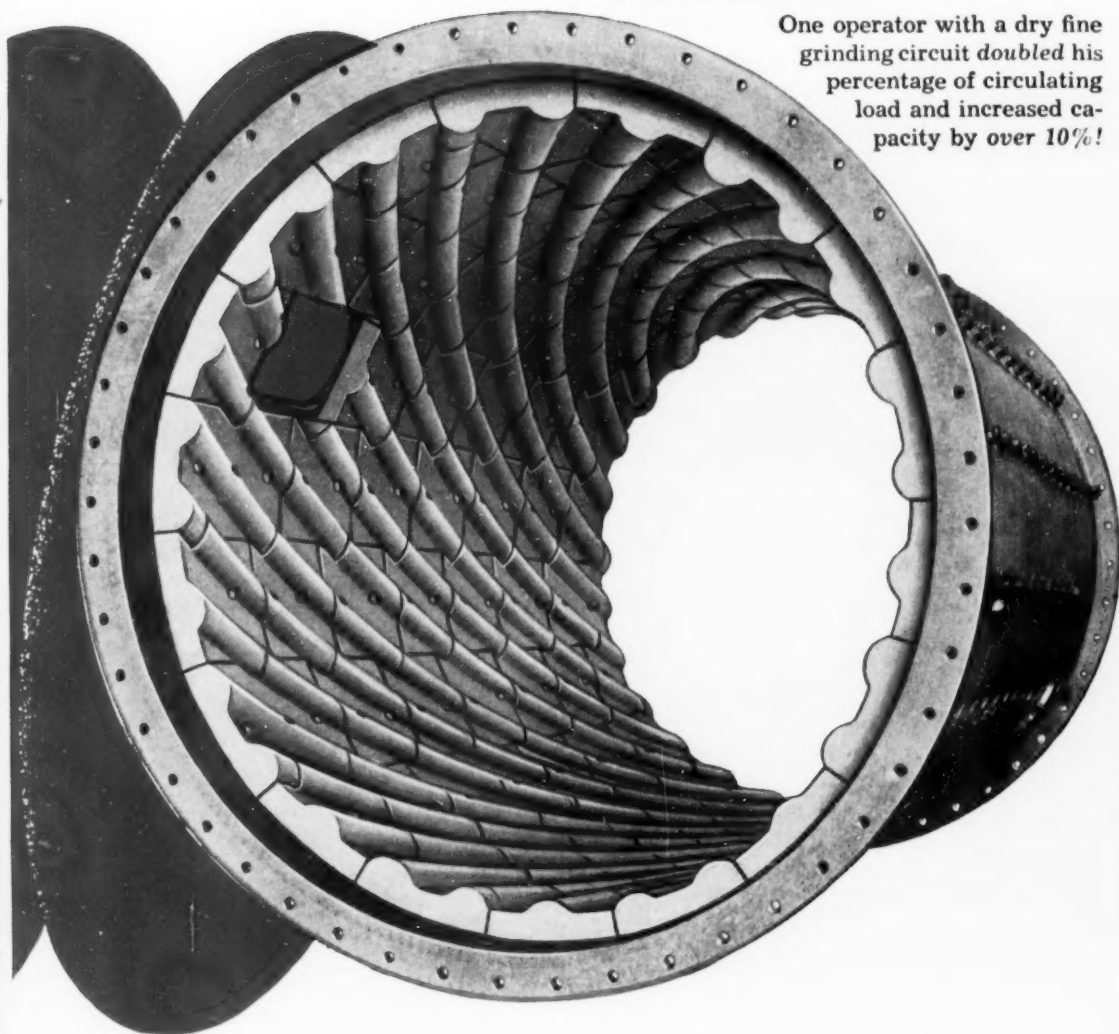
ALLIS-
MILWAUKEE 1,

**HERE ARE USER
EXPERIENCES . . .**

One operator with mills in a coarse wet grinding circuit *tripled* his percentage of circulating load with spiral liners.

Another wet grinding mill operator *tripled* circulating load and increased capacity by nearly 10%! Plans at this plant call for spiral liners for all ball mills.

One operator with a dry fine grinding circuit *doubled* his percentage of circulating load and increased capacity by over 10%!



CHALMERS

WISCONSIN





CRAWLING is often necessary but for *SPEED*

**there's nothing like
rolling on WHEELS!**



Under many conditions crawlers are the most practical type of mounting. BUT, very often traction is not much of a problem for shovels, cranes and draglines and you can make terrific savings by using a high speed LIMA PAYMASTER on wheels.

The picture at the right shows a LIMA Type 34-M PAYMASTER crane, equipped with a 35-ft. boom, unloading coal from a barge at an eastern Pennsylvania power plant. Note that it is mounted on an undercarriage with 12 rubber tired wheels.

This LIMA 34-M is a natural for industrial plants . . . it offers fast mobility between widely separated jobs, traveling up to 8.24 MPH on a 2.75% grade and 0.94 MPH on a 22.5% grade with four-speed transmission. Just one man is needed to operate it and a single engine powers the crane motions and propels the carrier. It can lift up to 20 tons and is readily convertible to a dragline.

If you would like to know more about how the LIMA Type 34-M PAYMASTER will pay off with speed and efficiency for your operations, drop a note to—



LIMA DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

Cable Address: Limashovel

LIMA
SHOVELS • CRANES
DRAGLINES • PULLSHOVELS



Construction Equipment Division

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

DOW XANTHATES

ASSURE MAXIMUM RECOVERY

Superior collector reagents make separation of sulfide minerals fast and complete... reduce operational costs



Every bubble is loaded to maximum carrying capacity when Dow Xanthates are on the job. Improved results are easy to measure in greater recovery and higher concentrate grade.

Substantially nonfrothing, these Xanthates offer the operator freedom to regulate frother and collector independently. To allow a choice of selectivity, Dow offers a wide range of Xanthates—all possessing good collector power. All Dow Xanthates are now shipped in pelletized form for convenient, dust-free handling.

To learn more about Dow Xanthates and the savings they can effect in your milling operation, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 3-38A.

consider these

DOW (BEAR BRAND®) Xanthates

- Z[®]-3 Potassium Ethyl Xanthate
- Z-4 Sodium Ethyl Xanthate
- Z-5 Potassium sec-Amyl Xanthate
- Z-6 Potassium Amyl Xanthate
- Z-8 Potassium sec-Butyl Xanthate
- Z-9 Potassium Isopropyl Xanthate
- Z-11 Sodium Isopropyl Xanthate

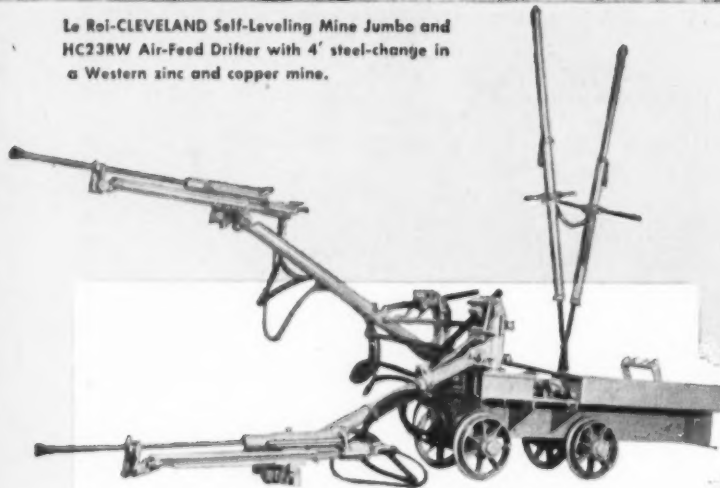
you can depend on DOW CHEMICALS



A compact Le Roi-CLEVELAND Air Motor powers the arm of this mine jumbo — miners can take it easier, yet get more done.



Le Roi-CLEVELAND Self-Leveling Mine Jumbo and HC23RW Air-Feed Drifter with 4' steel-change in a Western zinc and copper mine.



Le Roi-CLEVELAND MDR Jumbo

Le Roi-CLEVELAND Jumbos — equipped with air-motor-powered booms — reduce set-up time, drill out the round faster, shorten tear-down time.

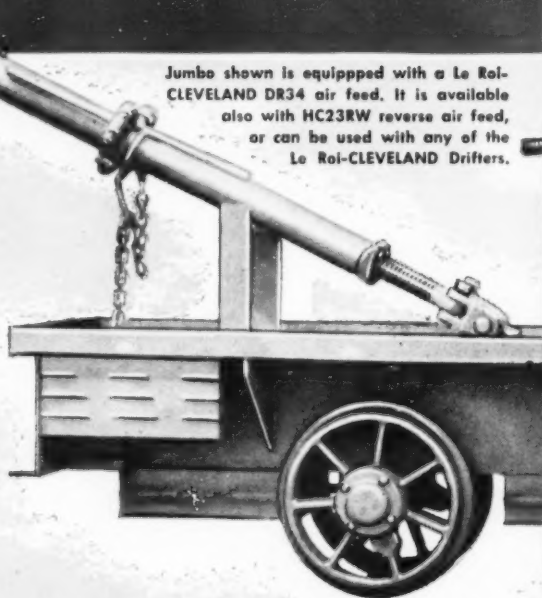
To spot his drifter, the miner simply opens a conveniently located operating valve. Then a powerful, compact Le Roi Air Motor takes over, raising or lowering the boom rapidly to the desired drilling position.

What's more important, the boom stays where it's put. Drifters stay in line — there's no steel binding, no wear-and-tear on chucks. Average drilling speeds are higher.

Write for complete information.

Space, Spot,

Jumbo shown is equipped with a Le Roi-CLEVELAND DR34 air feed. It is available also with HC23RW reverse air feed, or can be used with any of the Le Roi-CLEVELAND Drifters.

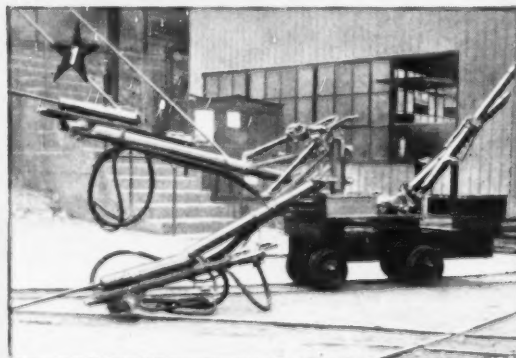


★ Le Roi-CLEVELAND 2-Boom Jumbo with power-feed drifters about to go underground.

★ Six-drill jumbo with Le Roi-CLEVELAND power-feed drifters and air-motor booms mounted on a 1½-ton truck for tunnel job.

★ Le Roi-CLEVELAND Jumbo equipped with long-feed drifters for use with carbide-insert bits.

★ Air-motor-powered booms give fast, solid set-ups. It's mechanically impossible for booms to drift during the drilling operation.





and Drill Holes Faster!



**Speed
drilling cycles!**

**Get better
fragmentation!**

**Save time
drilling lifters!**

**Speed loading
cycles!**

Use a Le Roi-CLEVELAND Self-Leveling Mine Jumbo

with 4' steel-change Air-Feed Drifter

Want to get more drilling done per man-shift? Here's an easy way to go about it: Give your miners a Le Roi-CLEVELAND Self-Leveling Jumbo. It has everything they need to do the work you want — and cut your costs, too.

It has a self-leveling air-motor-powered arm. And that means miners can spot and space holes quickly and easily, for the most efficient fragmentation. They don't have to loosen a bolt or tilt a boom, to complete the drilling cycle. It has an exclusive rigid screw and gearing mechanism

that keeps the heading straight, cuts down overbreak and underbreak. It also keeps the drifters in line, prevents the steel from binding, reduces chuck wear.

It has an offset arm that provides plenty of clearance to drill lifters. Miners don't have to take time out to swing the drill under the arm.

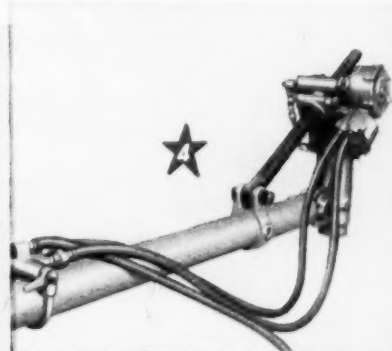
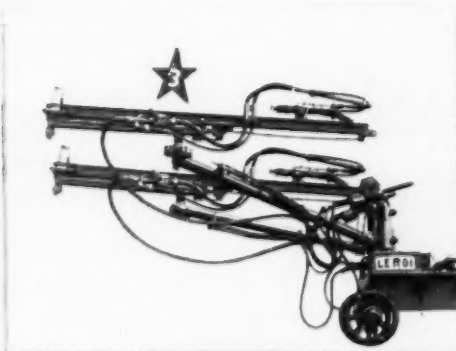
Together, these Le Roi-CLEVELAND features add up to faster cycles, greater tonnage per man-shift, lower costs! And that's why you owe it to yourself to get further information on both the single-arm and double-arm models. Write us today.

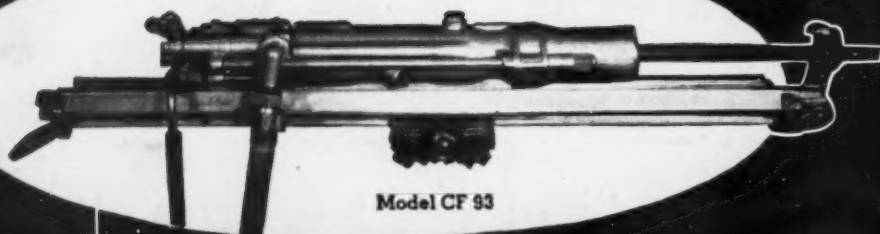


CLEVELAND ROCK DRILL DIVISION

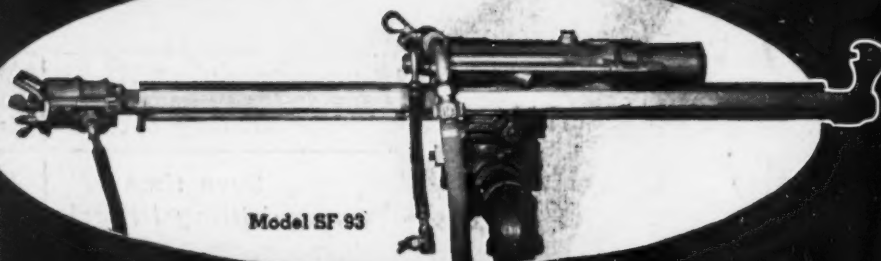
Le Roi Company A Subsidiary of Westinghouse Air Brake Co.

12500 BERA ROAD • CLEVELAND 11, OHIO Plants: Milwaukee, Cleveland and Greenwich, Ohio





Model CF 93



Model SF 93

Introducing the GARDNER-DENVER 93
...the **FASTER 3½" DRIFTER!**

Equals most 4" machines in drilling speed.
Exceeds all other 3½" drills in hole-cleaning ability.
Maintains correct bit pressure automatically —
regardless of ground changes.
Long feed aluminum alloy mounting — with automatic
feed motor on drill backhead or on guide shell.
Ask for Bulletin DD-2 — it gives complete specifications.

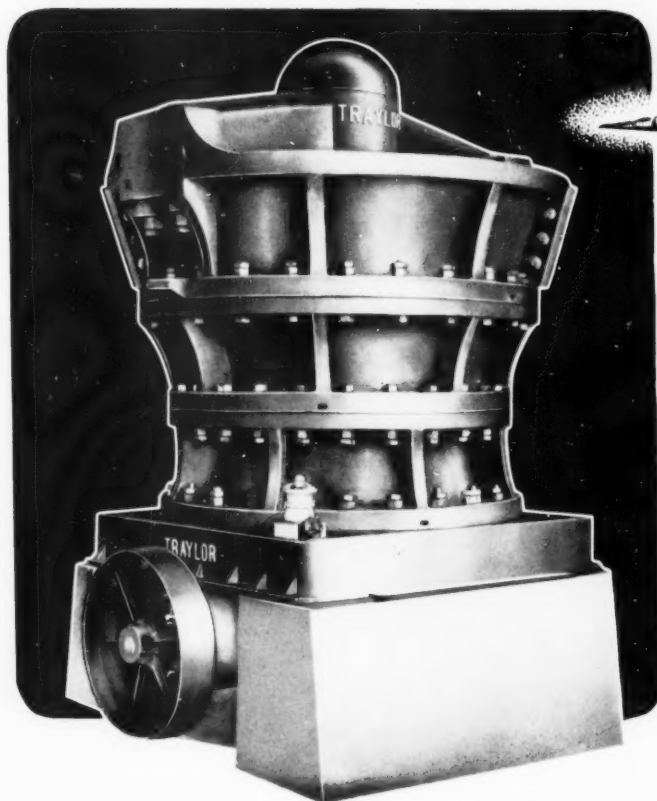
SINCE 1859 **GARDNER-DENVER**

Export Division: 233 Broadway, New York 7, N.Y., U.S.A.
Gardner-Denver Company, Quincy, Illinois, U.S.A.

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

119,000,000 tons

AND STILL GOING STRONG



A TRAIN

16,227 MILES LONG

would be needed to carry
the output of a typical

TRAYLOR 60" GYRATORY

ONE 60" Traylor Bulldog Crusher, installed in 1942, has worked continuously for 10 consecutive years. As a result it crushed well over 119 million tons of ore . . . and is still producing 6" ore at the rate of 3,984 tons per hour. Today, Traylor TC Gyratory Crushers, equipped with their original non-chokable bell head and curved concaves, continue to set amazing production records throughout the world. Traylor curved crushing surfaces apply power as a *direct* crushing force to reduce lifting and churning of material in the crusher. Each succeeding zone in the crushing chamber is of greater capacity . . . thus, choking and packing are practically eliminated. These features cause less wear on crushing surfaces . . . enable the Traylor TC to stand up to long years of steady and continuous operation with only routine maintenance.

Traylor

TY REDUCTION CRUSHERS

Free Bulletin: Mail this coupon today for your copy of Traylor's Bulletin 126 which gives full details.

TRAYLOR ENGINEERING & MANUFACTURING CO.
1583 MILL ST., ALLENTOWN, PA.

Send me Bulletin 126 with illustrations and specifications of Traylor TC Gyratory Crushers.

Name: _____

Position: _____

Company: _____

Address: _____ State: _____

Sales Offices: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.



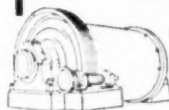
Primary Gyratory Crushers



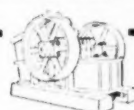
Rotary Kilns



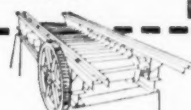
Secondary Gyratory Crushers



Ball Mills



Jaw Crushers



Apron Feeders

NOVEMBER, 1953

[World Mining Section—17]

17



ONLY CYANAMID OFFERS THIS
FOUR-WAY SERVICE TO HELP YOU
PUSH BACK THE ASSAY WALL

On every stope assay limits change whenever metal prices or "cost plus tails" fluctuate. With today's costs and current metal prices moving the assay wall ever nearer the working face, even a small decrease in tails can

have a profound effect on profits...and on ore reserves!

In your continuing efforts to improve metallurgy, Cyanamid can give you very practical four-way help...

1. REAGENTS

Cyanamid alone offers a most complete line of chemicals, both for cyanidation and flotation. With Cyanamid's long line of reagents you never need compromise one iota on the exact reagent combination for highest recovery.

In promoters, for example, Cyanamid offers a choice of twenty-two Aerofloat* and Aero** Promoters plus a complete line of Sodium and Potassium Xanthates. Also available are a variety of Aerofroth†

frothers, Pine Oil and Cresylic Acid.

Year by year, Cyanamid has developed such notable special purpose reagents as the 600 Series Depressants, the 400 Series, and the 800 Series Promoters for oxidized metallic and non-metallic ores. New methods have also been developed which have wide application for thickening and filtration of ore and other pulps. Other reagents are being aggressively researched.

2. FIELD ENGINEERS

Backed by the technical resources of Cyanamid Mineral Dressing Laboratory and kept constantly informed of progress in every mining field, Cyanamid Field Engineers are literally "walking encyclopedias" of current beneficiation practice.

But, by the same token, they are eminently practical mill men who can give you in-the-mill shirt-sleeves service on perplexing treatment problems. Their primary job is to help you work out the most efficient reagent combination and flow scheme.

3. DELIVERY SERVICE

To implement our application service, we maintain substantial warehouse stocks of metallurgical chemicals for cyanidation and flotation at strategic points. Frequently, mills can achieve substantial savings through lower-cost combination shipments and better

balanced reagent inventories.

Through periods of world upheaval spanning thirty-six years, Cyanamid has maintained deliveries world-wide ... a record of dependable service which we will do everything humanly possible to perpetuate.

4. PROCESSES

Since crushing and fine-grinding are so large a part of over-all milling costs, elimination of gangue at the coarsest possible size offers a fruitful field for cost cutting.

Cyanamid offers the two most advanced and efficient mechanical processes for this purpose: *Heavy-Media Separation Processes* and *Dutch State Mines Cyclone Separator Processes*.

Both employ unique, exclusive principles to achieve accurate, low-cost separation not obtainable by older methods. These processes have been used on millions of tons of a wide range of minerals as low-cost methods of pre-concentrating ore or tailings prior to froth flotation or other treatment, and to produce directly-marketable concentrates.

*Reg. U. S. Pat. Off.

**AERO is a trade-mark of American Cyanamid Co., applied to Xanthates, promoters, depressants, reagents, etc., for use in the flotation of minerals.

†Trade-mark.

AMERICAN *Cyanamid* COMPANY

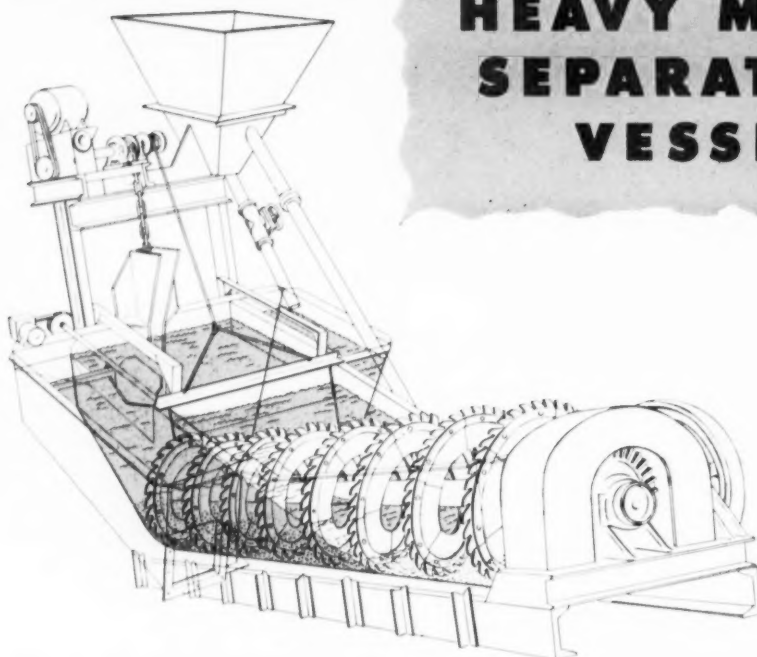
MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA

NEW YORK 20, NEW YORK

PROVED ADVANTAGES of

AKINS HEAVY MEDIA SEPARATORY VESSEL



Variation in Feed Rate, or Grade of Feed, is Not Detrimental

Because the Akins has a large pool area and volume, any increase or decrease in the rate of feed does not materially change the pool level. An increase in the amount of float will not crowd the machine causing float to report with the sink. Likewise, an increase in the amount of sink will not cause a crowding action causing sink to report with the float. Since the change in feed rate and in ore grade does not materially affect the pool level, circulation of media remains constant and metallurgical efficiency is maintained at a high level.

OTHER OUTSTANDING ADVANTAGES OF AKINS

Large pool area and volume facilitate better recovery of values from fine sizes.

Entire vessel is visible.

No intermixing of sink and float in product discharge.

Circulation of media at lower gravity and viscosity.

Gradation of gravity and viscosity from feed entry point to sink removal point provides natural cleansing of sink.

Three product separation in one machine.

Akins — the ORIGINAL spiral type classifier.

COLORADO IRON WORKS CO.

1624 17th Street • Denver 2, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

Sales Agents and Licensed Manufacturers in Foreign Countries

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO

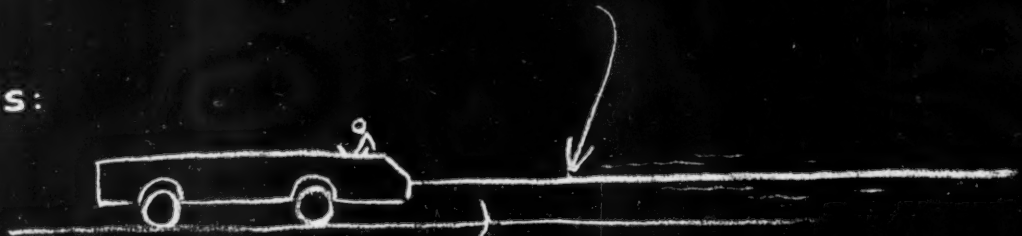
[World Mining Section—20]

MINING WORLD

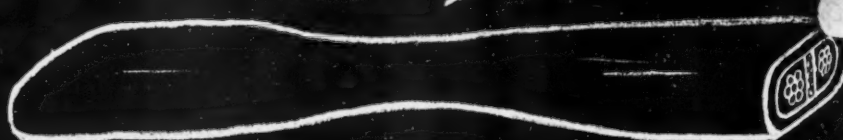


HOW TO SPOT DAMAGE FROM TOO MUCH TENSION

THIS:



MAY MEAN THIS:



NECKED-DOWN SECTION

... AND WHY ANACONDA'S NEW BALANCED DESIGN ADDS SAFETY, LONGER LIFE TO CABLE

Necked-down cable shows overstretching. Jacket and insulation become thin, easily punctured. Moisture penetration or a broken ground conductor may make the cable hazardous.

ANACONDA'S ANSWER: BALANCED DESIGN

Tension devices help; but aren't cures. An added safeguard lies in the balanced design of Anaconda's new mining-machine cable. Stretchability of the ground has been increased. It will not break before the power conductors. A new neoprene jacket has higher com-

pression-cutting resistance and tensile strength. In the insulation more strength and moisture resistance are obtained from a cold-rubber base . . . similar to that used by tire makers to mold a tougher tire. Stranding, too, has been redesigned to make the whole cable more flexible . . . at no greater cost. You get less trouble from tearing, cutting, gouging and abrasion caused by rib-pinching, runovers and dragging.

MUCH LONGER AVERAGE LIFE

In shuttle cars recently surveyed in 15 mines, ANACONDA Cables last 3 times

as long as cables made only a few years ago. To learn why this is so, ask your nearest Anaconda Sales Office or Distributor for a sample section of this new cable. Examine it . . . take it apart. And remember that no ANACONDA Mine Cable has ever failed a U. S. Bureau of Mines flame test. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

0-3300

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

FLAT-TWIN CABLES FOR:
shuttle cars
continuous miners
loaders cutters
drill trucks



HI-VOLT CABLES FOR:
mine power



TYPE SH-D FOR:
shovels



TYPE SO FOR:
hand drills
remote control



TROLLEY WIRE



FEEDER CABLES



TELEPHONE WIRE



SHOT FIRE CORD



WELDING CABLES

GM DIESEL
CASE HISTORY NO. 1A3-12

OWNER: Georgia Coating Clay Co.,
Macon, Ga.

INSTALLATION: Twelve GM Diesels
power shovels, Koehring
Dumpsters, GMC Trucks stripping
97 feet of overburden and
mining Kaolin.

PERFORMANCE: Equip. Supt. W. J.
Herrington reports 6-71 power-
ing Koehring 1½-yd. shovel
(background) has worked
45 hours a week, 52 weeks a
year for over 6 years--about
14,000 hours--without an
overhaul. Newer ¾-yd. Lima
(foreground), powered by a
3-71, has already operated for
3500 trouble-free hours.



It pays to STANDARDIZE on



14,000 HOURS WITHOUT ENGINE OVERHAUL

Long engine life between overhauls is only one advantage you get with General Motors Diesel engines. Power on every piston downstroke makes a 2-cycle GM Diesel accelerate faster under load—gets more work done every hour. Simple, practical design cuts down time because it does away with such trouble sources as high pressure fuel lines. When service is needed, you'll find the cost surprisingly low. GM Diesel engines are easy to work on—simple to inspect and service. And

comparison will show you that GM Diesel parts cost less.

You can get GM Diesel power in leading makes of shovels, tractors, hauling units, loaders, compressors and generators. A postcard will bring you a list of the 750 different models of equipment powered by General Motors Diesel engines.

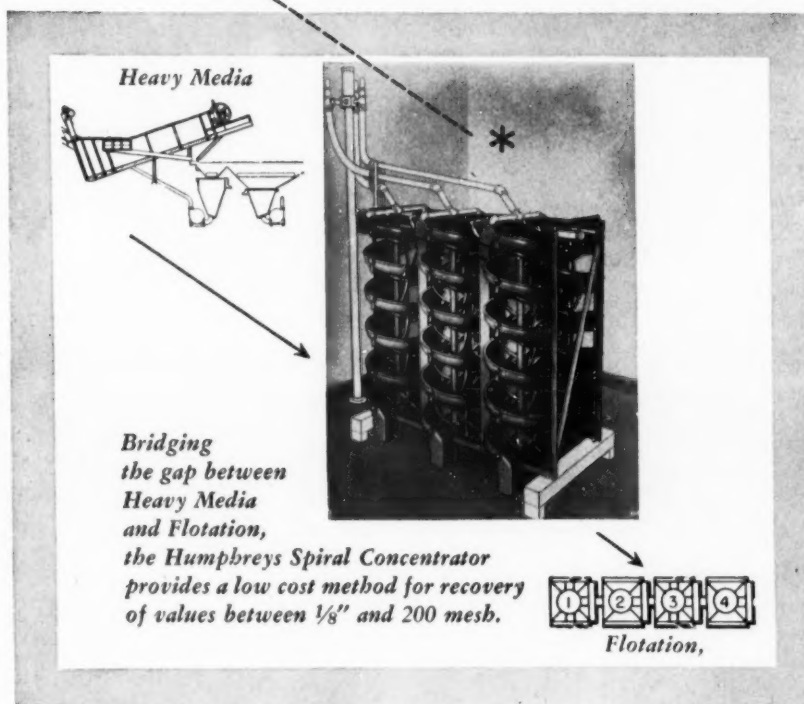
DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN
Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.

Low Cost Concentration

with the

Humphreys Spiral Concentrator



- ★ for separation of minerals of different specific gravity in ores at sizes generally minus 10 mesh.
- ★ for recovery of liberated values too coarse for flotation.
- ★ for recovery of other ore values from flotation tailing.
- ★ for recovery of values too fine to be economically treated by heavy-media separation.
- ★ for cleaning minus 1/4 inch bituminous or anthracite coal.

**Low cost of installation
Low operating costs
No moving parts**

Concentrating action of Humphreys Spiral—
Note wide black band of concentrate entering upper outlet, which is set for a wide cut, also narrow black band of middling entering lower outlet set for thin cut. In cleaning fine coal, phosphate rock and mica, refuse and middling are discharged from the concentrate ports and cleaned product follows the path shown as tailing.



The installation, operation and maintenance costs of Humphreys Spirals are so low that economical concentration of materials, which could not heretofore be worked at a profit, is now possible. There are no moving parts, no vibration, weight per unit of capacity is low and requires only a light foundation. Floor space per ton treated is very small.

HUMPHREYS SPIRALS are widely used in plant operations in the United States and abroad, ranging from 30 tons to 20,000 tons daily capacity, for concentration of fine iron ore; for concentration of chromite, ilmenite, rutile, and zircon from sands; for concentration of ground ores for recovery of lead, zinc, chromite, copper, barite, mica; for concentration of molybdenum flotation mill tailing for recovery of tungsten; for separation of fine phosphate rock from sand; for cleaning minus 1/4 inch coal; for concentration of pyrite from flotation mill tailing; for concentration of fine gold and gold bearing minerals.

A testing laboratory is maintained in Denver by the Engineering Division of The Humphreys Investment Company. Results obtainable in a full size plant may be determined by tests of a representative sample of minerals or coal weighing 300-500 pounds.

THE HUMPHREYS INVESTMENT COMPANY
ENGINEERING DIVISION

912 First National Bank Building • Denver 2, Colorado

Manufacturing and Sales Agents

SWEDEN: Sala Maskinfabriks A-B, Sala

AUSTRALIA: John Carruthers & Co. Pty. Ltd., Edgecliff, N.S.W.

BOLIVIA: Mauricio Hochschild S.A.M.I., La Paz

SOUTH AFRICA: Edward L. Bateman (Pty.) Ltd., Johannesburg

THE COLORADO FUEL



Four
of the
Twelve
CF&I Plants



CF&I MILL, PUEBLO, COLORADO—From its own iron ore, limestone and coal mines steel is made into Grinding Balls, Mine Rails and Accessories, Grinding Rods and many other steel products.



CF&I MILL, OAKLAND, CALIF.—In this plant steel rods made in the Pueblo Mill are drawn into wire for the fabrication of Col-Wic Industrial Screens—many of them made specifically for the mining industry.



IRON OR STEEL PRODUCTS PLANTS

Birdsboro, Pennsylvania
Buffalo, New York
Claymont, Delaware
Pueblo, Colorado
Roebling, New Jersey



STEEL FABRICATING PLANTS

Buffalo, New York	Palmer, Massachusetts
Claymont, Delaware	Pueblo, Colorado
Clinton, Massachusetts	So. San Francisco, California
Mt. Wolf, Pennsylvania	Trenton, New Jersey
Oakland, California	Worcester, Massachusetts

A N D I R O N C O R P O R A T I O N

STEEL PRODUCTS FOR THE MINING INDUSTRY

CF&I is a name to remember and a company to count on for steel and steel products for the mining industry.

Among the top steel producers of America, none surpasses CF&I in the diversity of the products that flow from its mills to the mines,

homes, farms, railroads and other industries.

The subsidiaries and divisions of CF&I make up a fast-growing and nation-wide family. Their plants and mills furnish products that have won for CF&I an outstanding reputation for quality and reliability.



CF&I MILL, BUFFALO, NEW YORK—This fully integrated iron and steel mill supplies steel rods for its own use and for CF&I fabricating plants throughout the East.



CF&I MILL, PALMER, MASS.—This plant fabricates wire drawn from steel rods supplied by the CF&I Buffalo Plant into Wickwire Rope.

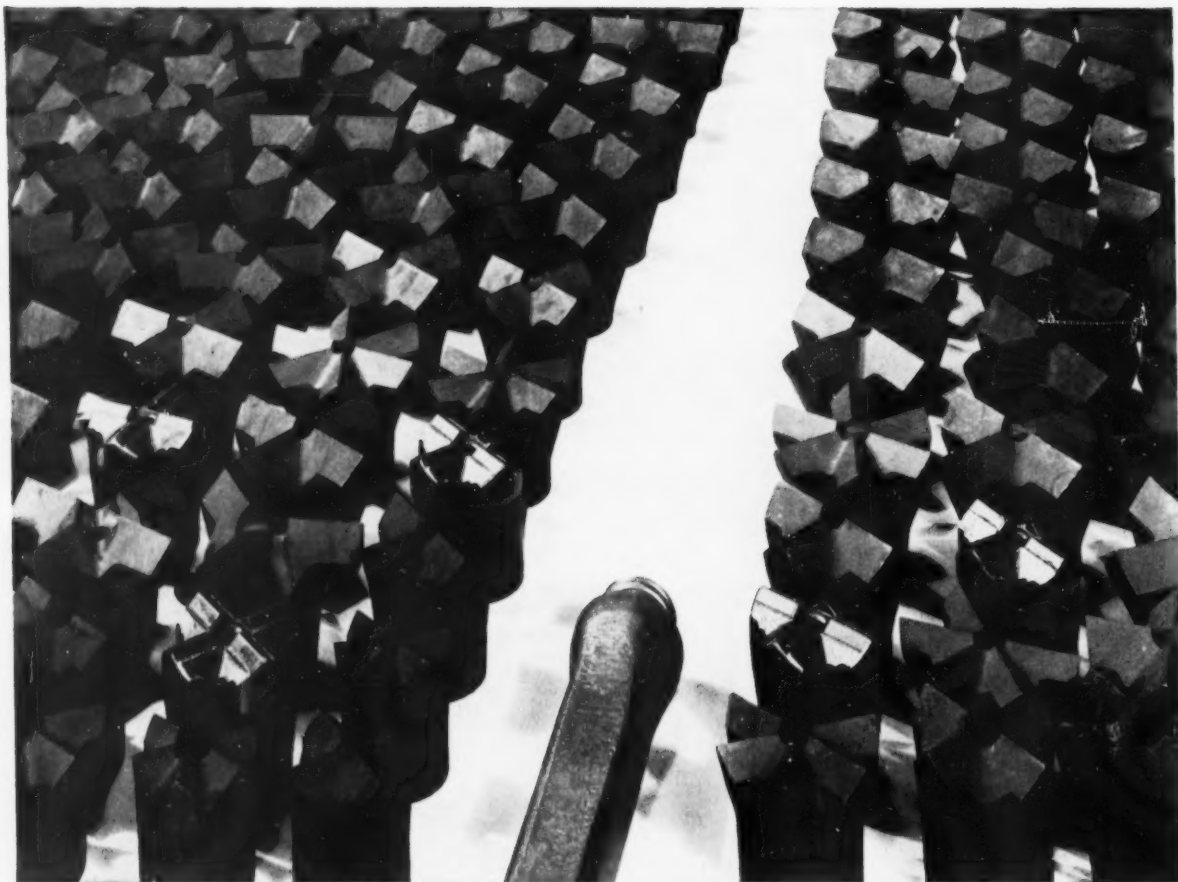
THE COLORADO FUEL AND IRON CORPORATION, Denver, Colorado

WICKWIRE SPENCER STEEL DIVISION, New York, N. Y. • PACIFIC COAST DIVISION, Oakland, Calif.

THE COLORADO FUEL AND IRON CORPORATION



Dozens of different TIMKEN® multi-use and carbide insert bits are interchangeable on the same steel!



You can change bits in a minute...save drilling time!

THERE'S no need to stock expensive double inventories of drill steel when you use both Timken® multi-use and carbide insert bits. In the same thread series, both types fit the same drill steel. In one thread series, for instance, there are dozens of different Timken bits.

By using Timken interchangeable rock bits on the same steel, you save drilling time. It takes just a minute to screw one type of Timken bit off—screw the other type on. For greatest drilling economy, use Timken multi-use bits for ordinary ground, switch to Timken carbide insert bits for hard, abrasive ground.

Both Timken multi-use and carbide insert bits are made from electric furnace Timken fine alloy steel, have special shoulder unions that keep drilling impact from damaging threads.

Why not let our rock bit engineers help with your drilling problem? It might be that just one tip could result in drilling savings. There's no obligation. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



*... your best bet
for the best bit
... for every job*

WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.

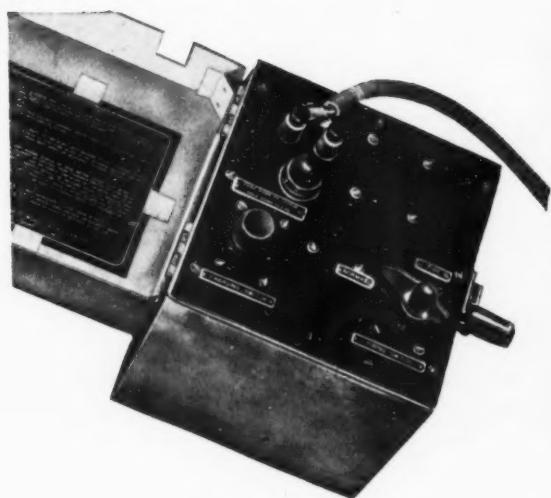
WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, small-diameter holes, very deep holes.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

MINING WORLD

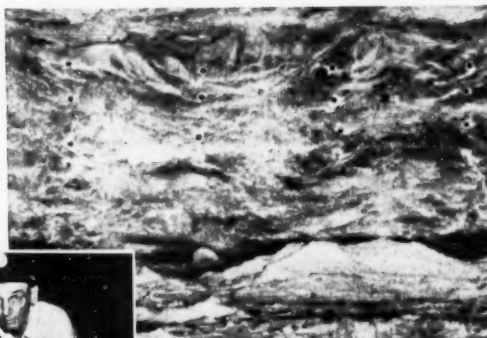


DU PONT CD* BLASTING MACHINES

*CD—Condenser Discharge

ELIMINATE SHOOTING LINES IN POTASH MINE

In extensive mining operations at Carlsbad, New Mexico, the U. S. Potash Company has used Du Pont Condenser Discharge Blasting Machines since they were introduced. They are now using six of these machines and, during the past two years, over 1,100,000 holes have been fired with Du Pont CD Blasting Machines. Elimination of the need for stringing and maintaining shooting lines throughout the mine has proved an important economy.



Work face in U. S. Potash mine ... undercut, drilled, loaded and ready for firing.



Muck pile after typical blast. Du Pont "MS" Delay Electric Blasting Caps produced excellent fragmentation.



Shift boss in the mine about to fire a blast with a Du Pont Condenser Discharge Blasting Machine.

(4) a test pilot light, and (5) a wiring and switching system with important safety features.

The Du Pont Explosives representative in your district will gladly give you complete information about CD Blasting Machines and explain how they may serve your own specific blasting requirements. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

Du Pont Condenser Discharge Blasting Machines are now available in four sizes: CD-12, CD-24, CD-32 and CD-48. Their capacities range from 20 caps in straight series to 1,200 in parallel series. They fill the need for a lightweight, portable source of power and eliminate costly permanent shooting lines.

All CD Blasting Machines are characterized by (1) extremely high capacity for their weight and size, (2) absence of moving parts, (3) elimination of the human element of mechanical-type machines,

NOVEMBER, 1953

DU PONT EXPLOSIVES

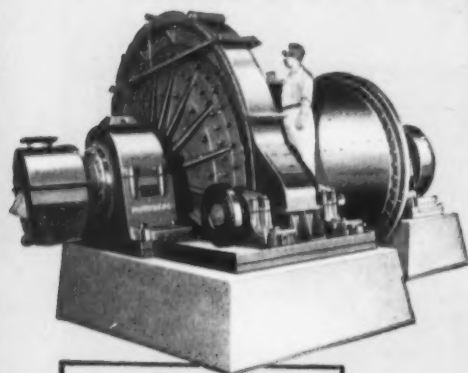
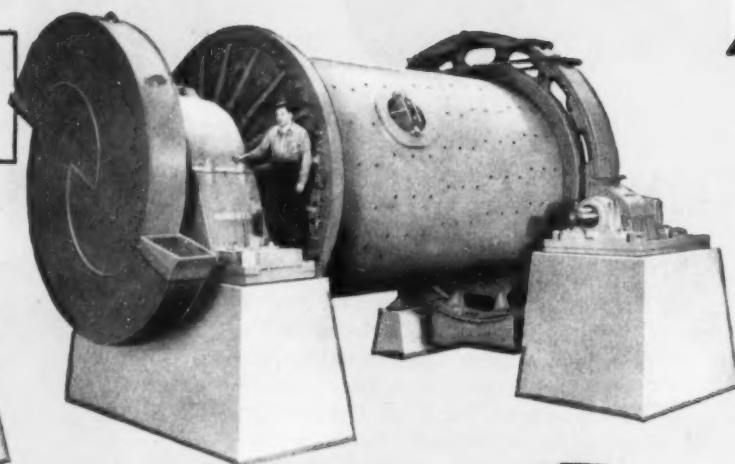
Blasting Supplies and Accessories



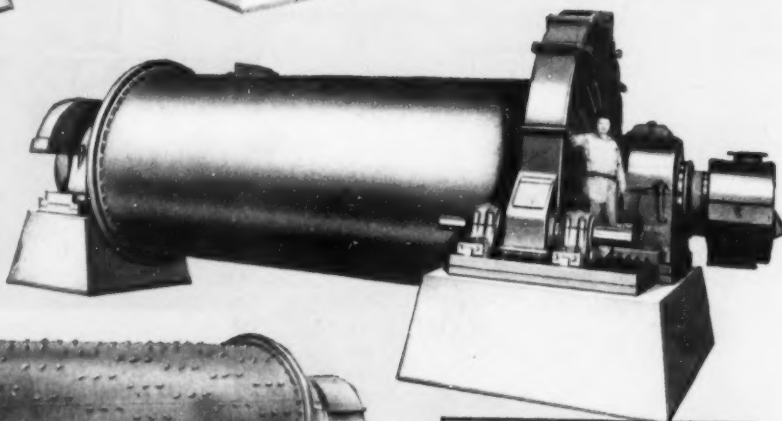
BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

NORDBERG GRINDING MILLS

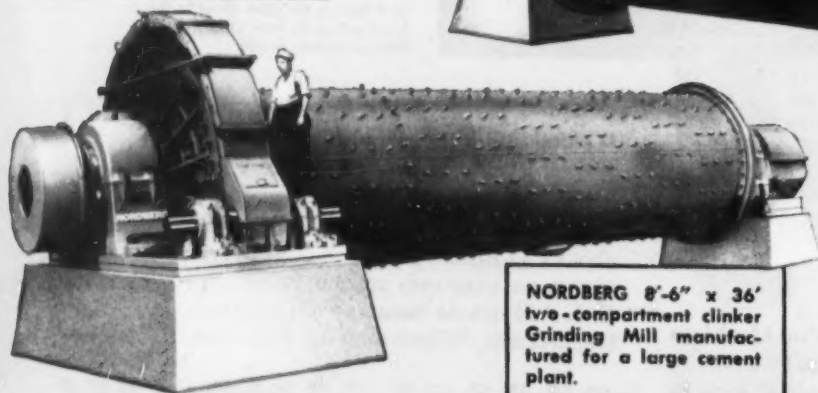
NORDBERG 10'-8" x 17'
Wet Grinding Mill snow-
ing scoop feeder.



NORDBERG 9'-6" diam-
eter x 11' long Dry
Grinding Mill.



NORDBERG 9'-6" x 24' Wet
Grinding Pebble Mill for
non-ferrous milling.



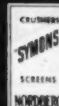
NORDBERG 8'-6" x 36'
two-compartment clinker
Grinding Mill manufac-
tured for a large cement
plant.

NORDBERG MFG. CO.
Milwaukee, Wisconsin

SYMONS . . . A REGISTERED NORDBERG
TRADEMARK KNOWN THROUGHOUT THE WORLD.



NORDBERG



MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON
TORONTO • MEXICO, D. F. • LONDON • JOHANNESBURG

for fast—low cost processing of Metallic and Non-metallic Ores, Minerals and Cement

MORE than half a century of progressive engineering achievement, combined with quality production in modern manufacturing facilities, have won for Nordberg a foremost position in the field of heavy machinery manufacture.

This is evidenced by the universal acceptance which Nordberg Machinery has received by most of the Mining and Mineral processing industries throughout the world.

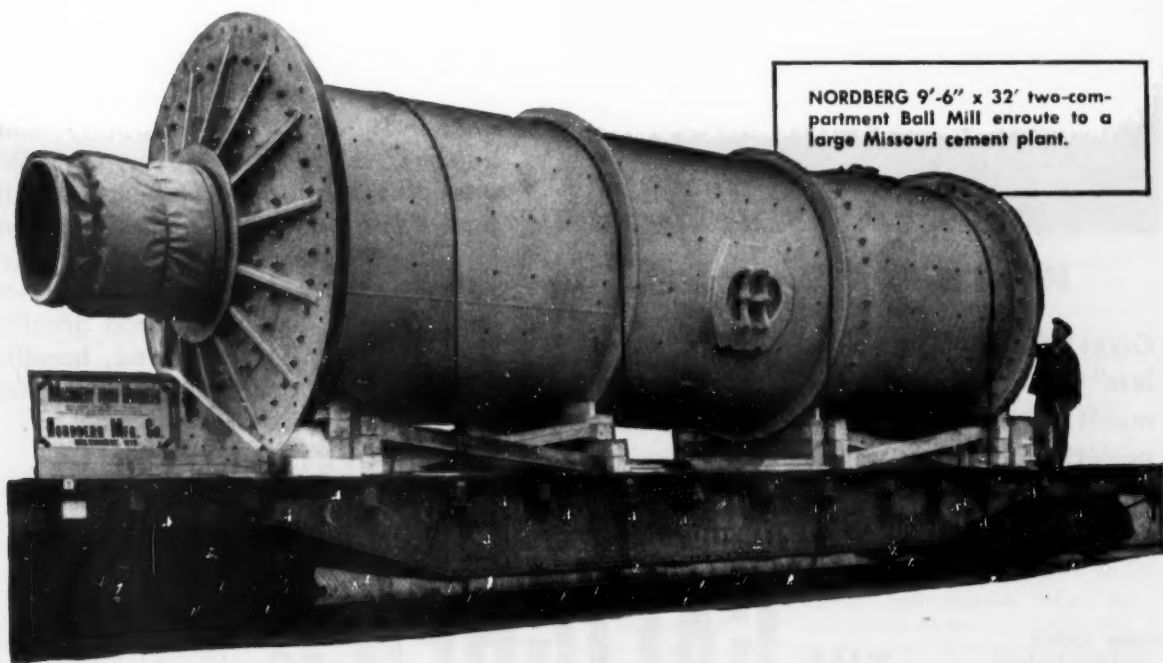
Typical of this heavy machinery is the complete line of Nordberg Grinding Mills available for the manufacture of Cement, the extraction of Metals from Ores, and

in the processing of Non-Metallic Minerals, which require comminution to fine sizes.

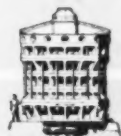
Nordberg manufactures Ball, Tube, Rod and Compartment Mills, of grate, overflow and peripheral discharge types for wet or dry grinding service, in sizes ranging to 13'-0" diameter, and in lengths to 40'-0"

Competent engineering services are available for new processing plant design or modernization of existing plants.

For large or small operations, you can depend on Nordberg Machinery to deliver maximum output at lowest possible cost.



NORDBERG 9'-6" x 32' two-compartment Ball Mill enroute to a large Missouri cement plant.



SYMONS
GYRATORY CRUSHERS



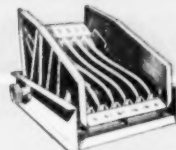
SYMONS
CONE CRUSHERS



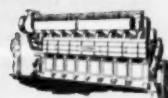
ROTARY KILNS
and COOLERS



SYMONS
"V" SCREENS



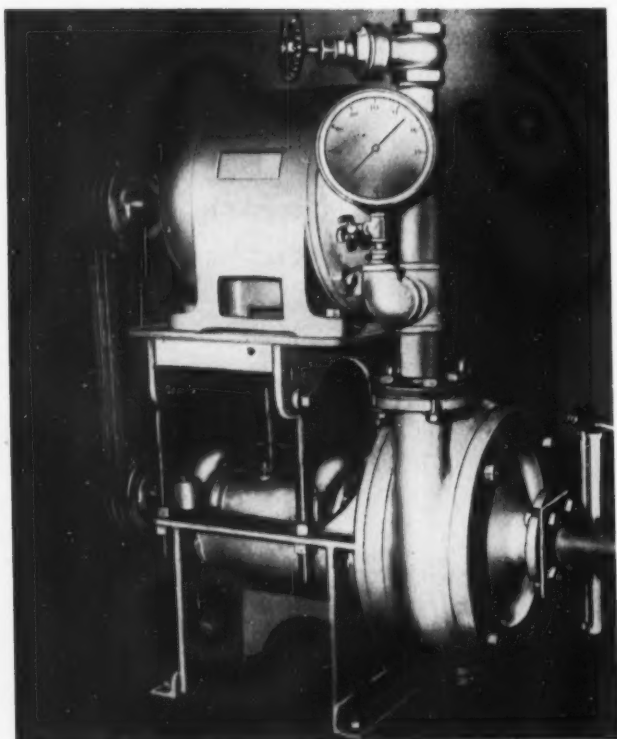
SYMONS VIBRATING
GRIZZLIES and SCREENS



DIESEL ENGINES —
10 to over 10,000 hp.

3rd year of successful service

VACSEAL



VERTICAL

PUMPS

& STANDARD

This success story concerns a Vacseal Pump — the first manufactured and put in service in the United States. It was installed for the handling of abrasive pulps back in 1950. Its three years of operation has been satisfactory in every way. Only one part has been replaced and the pump has required minimum servicing. In fact, this and many other Vacseal Pumps — vertical and standard — have been used in exhaustive and gruelling tests over the 3-year period, handling both abrasive and corrosive materials. The detailed records spell out . . .

EXCELLENT SERVICE

WRITE FOR CATALOG

Gives full details on unique VACSEAL "glandless" feature that eliminates impeller adjustments and requires no sealing water to protect glands and clearance spaces.

Leaders in Experience & Service

THE GALIGHER co.

CONSULTATION • ORE TESTING
PLANT DESIGN • GEOLOGIC INVESTIGATION



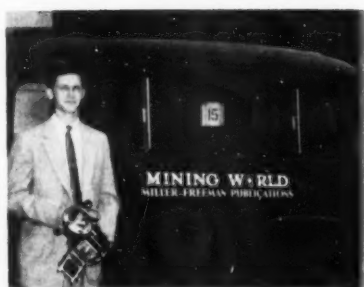
HOME OFFICE
545 West 8th South
Salt Lake City, Utah
P. O. Box 209

EASTERN OFFICE
921 Bergen Avenue
Jersey City, New Jersey
Agents In All Principal
Foreign Mining Districts

- Drifts and Crosscuts -

Meet Marvin

Hustad—The newest field editor of MINING WORLD is pictured here. Many of the Illinois-Wisconsin zinc-lead miners, as well as the Minnesota and Michigan iron ore miners, already know him be-



cause of his work and travels. He graduated from high school at Mondovi, Wisconsin in 1945. On January 23, 1953 he received a Bachelor of Science degree in Mining Engineering from the Wisconsin Institute of Technology at Platteville, Wisconsin.

Between high school and college he served in the United States Army's mountain infantry as a ski and rock climbing instructor at Camp Hale, Colorado. Camp Hale is almost equally distant from the famous Colorado mining camps of Leadville, Climax, and Gilman, so his mining engineering studies probably were planned during the many winter months he slept in a tent.

While attending college he worked part time at Platteville for the Mineral Deposit Branch of the United States Geological Survey, and the New Jersey Zinc Company. After graduation, he returned west to work as an engineer and geologist for the Black Rock Mining Corporation's Lincoln tungsten mine near Tempiute, Nevada.

He is a confirmed sportsman and finds his new job allows him to fish for salmon in Puget Sound one week and hunt ducks in Wisconsin the next. In keeping with MINING WORLD's tradition of widespread mine-to-mine travel, the new ¾-ton GMC passenger truck he will drive is also shown in the picture.

Oh yes, he didn't catch any salmon at Seattle but he did take the pictures and wrote the convention report starting on page 57.

Lead and Zinc Tariffs—The National Lead and Zinc Committee is presenting the domestic mining industry's case before the United States Tariff Commission on November 3, 4, and 5th. The committee is petitioning for escape clause relief under provisions of the Trade Agreements Extension Acts of 1951 and 1953. The Committee is seeking an increase in tariff rates of 50 percent over the existing rates on January 1, 1945. These rates and the petitioned increases are as follows:

Tariff	Lead ores, etc.	Lead bullion, etc.	Zinc ores, etc.	Zinc slab, etc.
1945	1.20¢	1.70¢	1.20¢	1.40¢
Add 50%	.60	.85	.60	.70
Total	1.80	2.55	1.80	2.10
NOW	0.75¢	1.0625¢	0.60¢	0.70¢

NOVEMBER, 1953

Action of the Committee is based on recommendations of top governmental officials who urged the miners to seek escape clause relief when testifying before the House Ways and Means Committee on May 15. These officials include Hon. Sinclair Weeks, Secretary of Commerce; Hon. Harold E. Stassen, Director of the Mutual Security Agency; Hon. Douglas McKay, Secretary of the Interior; and Hon. John Foster Dulles, Secretary of State.

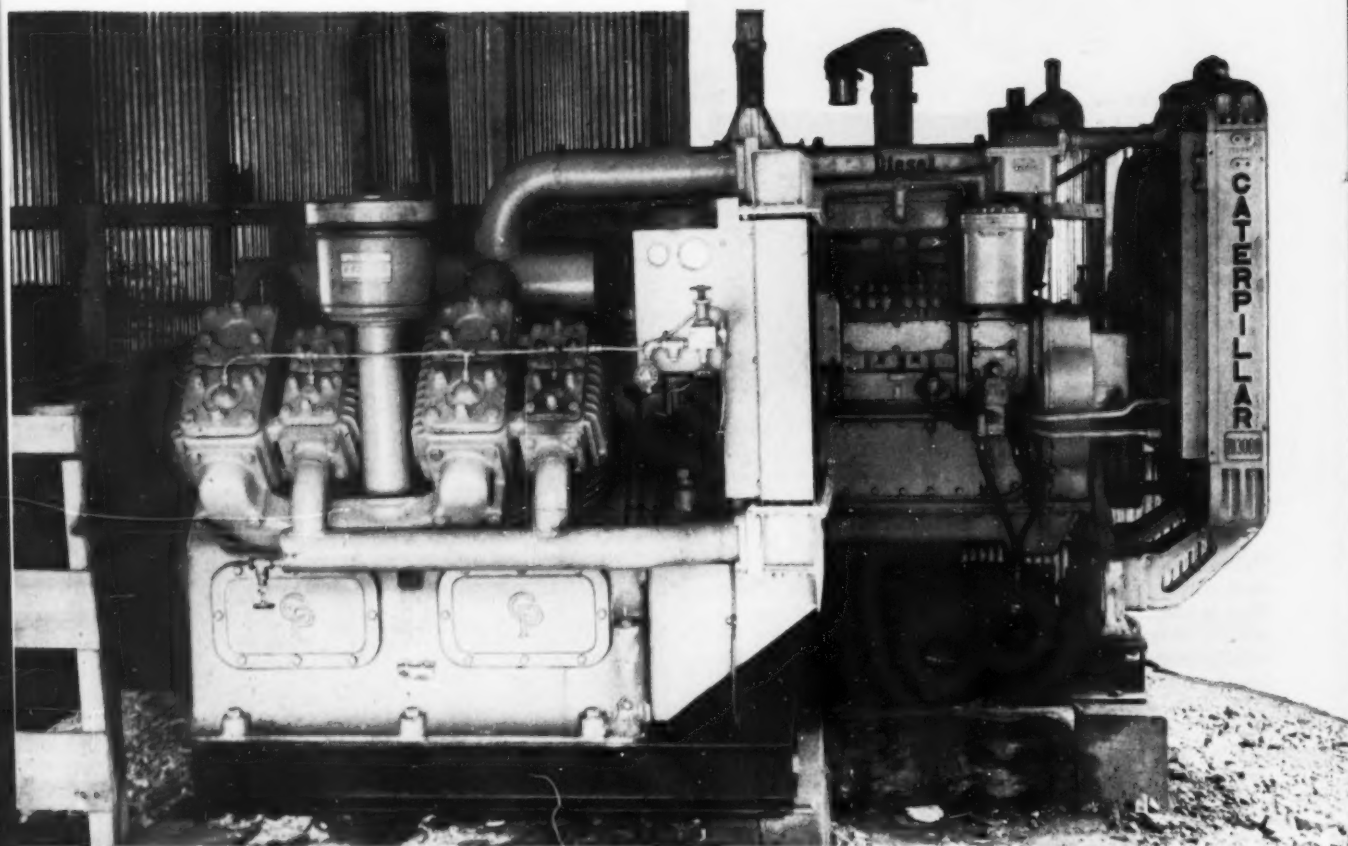
There is no question that prompt relief is needed. The news sections of this issue are again full of reports of mine curtailments and closings. Delay until the Commission on Foreign Economic Policy completes its studies nine months or a year from now will weaken a basic industry which is essential to national security.

Domestic Developments—How many of you have forgotten the unclaimed United States Atomic Energy Commission prize of \$10,000 for the first domestic production of 20 short tons of uranium ores or mechanical concentrates assaying more than 20.0 percent U_3O_8 ? . . . The Utah Exploration Company has been the recent favorite with its spectacular Mi Vida mine south of Moab, Utah. . . . Don't overlook Vernon Pick's Delta mine near Hanksville, Utah. . . . Pick has set his mind on the prize. . . . Let's all hope somebody wins it.

Metal Markets—The St. Joseph Lead Company deserves commendation for its efforts in behalf of domestic zinc miners. . . . The company is showing zinc consumers that when they need zinc the worst, imports are the smallest. . . . That when zinc is abundant, imports are highest and domestic zinc production is discouraged. . . . Domestic production which may be vitally needed on very short notice. . . . Back the St. Joseph theme—"For Reliability of Supply and Unquestioned Quality—Specify Domestic Zinc." . . . Molybdenum has a new use. . . . It is used in combination with silica to form molybdenum disilicide which resists temperature as high as 1,700° C. . . . First use will be for heating elements in ceramic and glass making furnaces. . . . Metallic molybdenum withstands very high heat only in a vacuum but the new compound does not require a vacuum for its use.

Gold—The Texas legislature has officially called on the Congress of the United States to approve legislation authorizing the sale of gold from domestic mines by producers on the open market at prevailing world prices. . . . Also that Congress investigate the reasons for restricting gold purchases and sales by United States citizens. . . . Further that Congress investigate why the International Monetary Fund has consistently sidetracked the issue involved in raising the price of gold on an international basis.

"We just start it up and it goes"



Up in Salida, Colo., at 8500 feet elevation, the Frank H. Norberg Co. recently installed a husky Caterpillar D13000 Diesel Engine. It drives a 500-ft. Chicago Pneumatic stationary compressor, mining limestone for use in steel flux and refining beet sugar. It's dusty work, at high altitude, in extreme summer-winter temperature variations.

"We use only Cat* power," says Superintendent W. H. Larson, "because we just start it up and it goes—with little care or trouble."

The company's new engine is the choice of *experience*. They also have a Cat HT4 Shovel, a D4 with Eimco rocker bucket, and another Caterpillar D13000. Owner Frank Norberg says, "In my 30 years of rock engineering, when I've needed power I've never considered anything but Caterpillar. I'm more than pleased with this equipment."

Many mining operators have found that it pays to standardize on Caterpillar equipment. Because these rugged yellow units are noted for long, pamper-free work life, they return you a profit for many years. Standardi-

zation also pays off in increased operator familiarity, and in a single, responsible source for parts and service. That source is your nearby Caterpillar Dealer, who offers fast, skilled service and a full line of genuine factory parts.

All Caterpillar Engines deliver full, honestly rated power, and idle without fouling, on low-cost No. 2 furnace oil. Engines and electric sets range up to 500 HP and 315 KW. Leading manufacturers can supply Caterpillar Engines in their equipment, or your dealer can install them when you repower. Ask him to prove the dollars-and-cents advantages of Caterpillar power today.

Caterpillar Tractor Co., San Leandro, Cal.; Peoria, Ill.

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FOR HIGH-PROFIT
PRODUCTION**



CAPITOL CONCENTRATES

STOCKPILE ATTACK CONFIRMS NEW SPECIFICATION'S NEED

The statement by Senator Styles Bridges of New Hampshire that he understands the stockpiles are full of "shoddy" material is not only curious for its phraseology, which sound like that of a clothing merchant, but must be somewhat alarming to domestic producers who for a long time have tried to sell the government on the idea that it is better to produce low-grade ores of certain metals here and beneficiate them than to be dependent entirely upon foreign sources however fine the foreign ores may be.

Of course, it seems a little absurd to apply the word "shoddy" or sub-grade to such items as copper, lead, zinc, and a number of other metals and minerals for which specifications have been standard on the market for years.

The attack by Bridges seems to have been leveled at the Emergency Procurement Service of the General Services Administration, which has the responsibility of PURCHASING stockpile materials but, mind you, only within the very rigid specifications set up by the Munitions Board. Other ores purchased by GSA at the behest of DMPA and ODM are not actually in the stockpile until they are upgraded to Munitions Board standards. Public Law 520, the Stockpile Act, gives ample authority for beneficiation of low-grade ores, as does the Defense Production Act. Whatever may be purchased under the Defense Production Act will not be apt to find its way into the stockpiles without meeting Munitions Board specifications. The unrealistic bars have been lowered occasionally to permit the stimulation of domestic production of really critical minerals and metals.

As a matter of fact it may interest Senator Bridges to know that domestic industry and western congressmen have for years waged a running fight, often mentioned in these pages, with the Munitions Board to get certain specifications made more realistic and possible for the domestic producer to fulfill. It has been brought out in hearings time and again that Munition Board specifications were, in many instances, written so that only foreign producers could qualify. It has only been during the last "emergency" that producers of certain domestic minerals have been given a break. Senator Bridges' ill-advised outburst could work out to the disadvantage of both domestic producers and the national security.

• Copper Survey Ordered

The Office of Defense Mobilization during the second week in September ordered the General Services Administration to sign no further "maintenance of copper production" contracts pending another review of the copper supply situation. The result of the survey will probably be bad for United States producers and good for Chile.

• Just What Do The Figures Mean?

To further confuse the stockpile situation, the ODM now states that the purchase goals on one-half of 76 critical materials are 75 percent completed. Remember

those old algebra problems—"if the head of a fish weighs $\frac{1}{2}$ as much as $\frac{1}{4}$ of 3 inches of the tail, etc., etc.?" How much of the 75 percent is in the warehouses and how much is merely contracted for future delivery from some God-forsaken spot is not divulged in this latest revelation, nor what these figures mean in the light of objective cut-backs and the new stretch-out program. Objectives may be altered at will and frequently are. The percent of saturation of any programs can be increased merely by reducing the objective. Such figures as the Congress and the public are given about the stockpiling program mean very little—there is too much elasticity in them.

• ODM Should Have Mining Man

The latest United States Government Organization Manual shows that the Chief of Defense Mobilization has vacant the position of Assistant Director for Materials. Here is a good chance for Director Flemming to appoint some well-known mining man like Howard I. Young to this post which is a policy position of vast importance to the mining industry. As minerals compose the bulk of defense procurement, an expert in this line is very definitely indicated. The position, no doubt, will go to someone skilled in totally unrelated lines.

• Survey Division Is Proposed

During the first part of August 1953, the U. S. Bureau of Mines conceived the idea of a new baby called the "Minerals Industry Surveys Division." This new organization within the bureau will be supposed to conduct difficult and complicated economic and technologic surveys of mineral industries on a regional basis in the "interests of the national defense" and for "the welfare of" the overstuffed Washington office of the bureau. These regional surveys are supposed later to be resolved into national plans with which to guide free enterprise in its wayward, uncoordinated and individualistic efforts.

It is understood that the statistical division responsible for the collection of production data will be decentralized to the various regional headquarters. Field statistical branches of long standing, as at Salt Lake City, are slated under the plan to be transferred to regional headquarters, not, as one Bureau official remarked, for greater efficiency but for the convenience of regional headquarters staff.

The idea behind this proposed new division is to provide greater service to the mining industry. If the situation is not watched closely, however, companies may find themselves receiving an increased volume of lengthy questionnaires since it is the nature of any new government organization to find more and more work to keep it busy.

The "Minerals Industry Surveys Division" should be a happy home for engineers who believe they are economists and no doubt many detailed and erudite reports will be written. Whether such a move will eventuate in more ore being dug and more mines saved from closing down will remain to be seen.

It is reported (how authoritatively is not known) that nearly 200 people will be required to handle the Wash-

ington end of the division, no doubt to coordinate the field work and to check it. A partial list of Washington personnel as planned is said to be: 3 analytical statisticians, 80 statistical clerks, 19 statistical assistants, 1 statistician (lonesome, eh?) 1 statistical draftsman, 1 mathematical statistician, 1 statistical analyst, 1 engineer economist, 1 international trade economist, 4 business economists, 3 general economists, 5 commodity specialists, 41 commodity industry analysts, 1 commodity industry specialist, 1 economic analyst, 1 economic geographer, 1 petroleum and natural gas economics coordinator, several chiefs of commodity branches and assistants.

This sounds like an imposing array of talent (some titles seem to be a trifle overlapping) to find out if production fell off or increased and why. If the material is not made available any sooner than that in the *Minerals Yearbook*, any plans to help the industry may well be obsolete before they are made known. One of the curses of government has been too many professors and economists who may have helped to consume paper and to issue reports, but who seldom have come up with any practical solutions to burning problems.

It is to be hoped that if this proposed new division is actually formed its work will be kept as objective and constructive as possible, or the U. S. Bureau of Mines may find itself with another misfire on its hands.

• It Won't Be Quite That Simple!

The recent announcement by the General Services Administration that the U. S. Bureau of Mines and United States Geological Survey would act exclusively as consulting engineers to that agency seems to be a public statement of a program that has been in existence as a practical fact for a long time. Administrator Mansure of GSA states, "The Department (Interior) has the know-how and we will make use of it. It's as simple as that." Mansure probably will find out that it's not as "simple as that." But the announcement sounds good and as though large economies and efficiencies would be the outcome of this "new" policy. Well, live and learn!

By the time a request for services is cleared by an "operating committee" and it filters down to the field men of the other agencies, and time is found to do the job and the reports filter back up and over to GSA, Mansure will probably have ulcers. GSA would be better off with its own staff engineers, picking the files and brains of the Interior Department wherever desirable, of course, and letting the U. S. Bureau of Mines and United States Geological Survey get on with their own jobs. It would be simple and quicker and just as cheap because the work will be done on a reimbursement basis anyway.

COMING CONVENTIONS

December 1, 1953. Annual Meeting AMERICAN MINING CONGRESS, 6:00 PM University Club, New York, New York.

December 2 to 4, 1953. MIDCENTURY CONFERENCE ON RESOURCES FOR THE FUTURE, Washington, D. C.

December 4 and 5, 1953. NORTHWEST MINING ASSOCIATION, Davenport Hotel, Spokane, Washington.

January 26 and 27, 1954. SCINTILLATION COUNTER SYMPOSIUM, Statler Hotel, Washington, D. C.

January 28, 29, and 30, 1954. Annual meeting of the COLORADO MINING ASSOCIATION, Shirley Savoy Hotel, Denver, Colorado.

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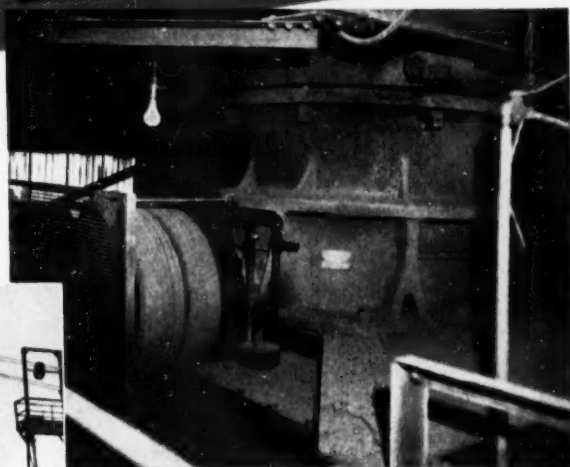
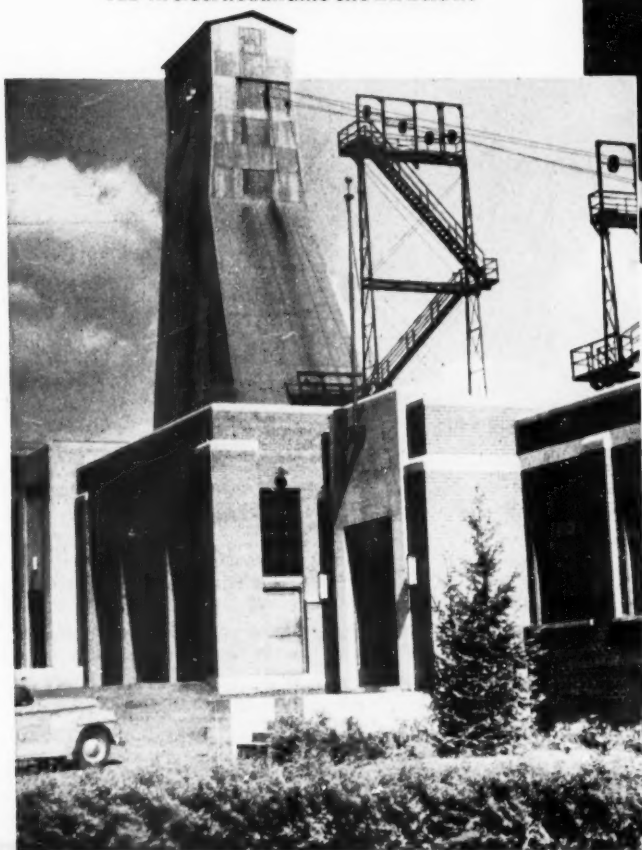
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**OVER 3,000,000 TONS
HAVE BEEN CRUSHED
by this TELSMITH**

The 13-B Telsmith Gyratory Crusher is located in the upper part of the 135-ft. steel headframe shown below.



● An important iron ore producer in the Iron River district of the Menominee Range in Michigan finds his Telsmith Gyratory Crusher to be exceptionally economical.

Installed in 1942, this Telsmith 13-B Crusher handles about 35,000 tons of ore per month, and to date has crushed over 3,000,000 tons. Crusher upkeep expense has been exceedingly low, consisting of only one set of eccentric bearings and some very minor parts. For details on Telsmith's bigger capacity and lower upkeep, get Bulletin 271.

Min.-34

SMITH ENGINEERING WORKS, 4034 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Mine & Smelter Supply Co.
Denver 17, Colo.

Foulger Eqp. Co.
Salt Lake City, Utah

Mines Eng. & Equip. Co.
San Francisco 4, Calif.

Robert S. Bailey
816 W. 5th St., Los Angeles 17, Calif.

Lee Redman Equip. Co.
Phoenix, Arizona

The Sawtooth Company
Boise, Idaho

General Machinery Co.
Spokane 31, Wash.

Clyde Equipment Co.
Portland 9, Ore. Seattle 4, Wash.

Gordon Russell, Ltd.
Vancouver, B.C.

They piled up 13,000 hours...

without overhaul

BETWEEN them, these two Caterpillar D7 Tractors with No. 7A Bulldozers have worked more than 13,000 hours before being overhauled. One has 6000 hours with no overhaul yet; the other went more than 7000 before visiting the shop. Owned by Bob Hawkins Construction Co. of Fort Deposit, Ala., they are shown 'dozing out settling basins at an iron ore stripping operation for Greenville Mining Co.

Ore averages 46-55%. Dirt must be removed regularly from the basins after settling. That means summer and winter operation for these sturdy yellow machines. Quick-starting, they need no pampering even on coldest winter days. They have stamina to work in frozen materials, and balance and traction to keep going when it's sticky underfoot. They're built to work the year around—or as far into the winter as you want them to work, and then get you off to an early start again in the spring.

These are all reasons why many mining operators winterize with Cat® machines. These big yellow bruisers pay

off the year around with dependable high production. They stand up to equipment-busting mine work, thanks to extra-sturdy construction and special high-strength steels.

Your Caterpillar Dealer offers a wide range of tractors and matching bulldozers. He will arrange a practical, on-the-job demonstration of the dependable Cat-built team that suits your job to a "T." Call him now—and count on him whenever you need fast, skilled service and genuine Caterpillar parts.

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WITH CAT EQUIPMENT**



INTERNATIONAL PANORAMA



TRAIL, BRITISH COLUMBIA—The Consolidated Mining and Smelting Company of Canada, Limited has installed the world's largest electric induction furnace for melting electrolytic zinc sheets. It has a capacity of 300 tons per day.

LONDON—Great Britain has purchased 15,000,000 ounces of silver from Russia for use as partial payment of 88,000,000 ounces Lend Leased by the United States. Purchase price per ounce was \$0.84.

LA PAZ, BOLIVIA—A United States firm, New Enterprises, Inc., is making a test of its new tin refining process. A gas is used as a reducing agent in a controlled atmosphere in smelting low-grade tin concentrates.

VIENNA, AUSTRIA—In July a total of 258,650 metric tons of iron ore were mined in Austria to set a post-war monthly record.

CHATTANOOGA, TENNESSEE—Cramet, Inc. will build its new \$25,000,000 titanium metal plant here. Initial production is scheduled for late 1954 or early 1955.

LEADVILLE, COLORADO—Newmont Mining Corporation has purchased full control of the Resurrection Mining Company. Newmont paid \$500,000 to each of its former partners—United States Smelting, Refining and Mining Company and Hecla Mining Company—for their one-third interests.

MOAB, UTAH—The Cal Uranium Company is sinking a 250-foot-deep vertical shaft at its San Juan uranium mine to explore and develop a large uranium deposit found by United States Atomic Energy Commission diamond drilling.

KUALA LUMPUR, MALAYA—The Malayan Miners Company has started preliminary work for the reopening of the Srimedan iron ore mine 12 miles north of Batu Pahat. Contract sales to Japanese steel companies are under negotiation.

SPOKANE, WASHINGTON—Attwood Copper Mines, Ltd. has started deep exploration at its Lone Star copper mine in northern Ferry County, Washington. The work is on a DMEA contract valued at \$109,196.

TOKYO, JAPAN—The Fuji Iron and Steel Company will import 40,000 tons of Malayan iron ore in the next six months. Ore will be mined in the Ipoh district.

KUALA LUMPUR, MALAYA—Kramat Pulai, Ltd. has started the first off-shore prospecting in the sea bed in Malaya. Prospecting for tin will be along the coast of Malacca.

LAS VEGAS, NEVADA—The United States Air Force has disclosed its needs for 35,000 tons of titanium metal for planes in 1955. Total supply available will be only 13,400 tons, it was disclosed at a United States Senate hearing.

BUENOS AIRES, ARGENTINA—Exports of 394.37 tons of beryl have recently been made to the United States from Argentinian mines.

SPRUCE PINE, NORTH CAROLINA—The Deer Park feldspar and mica mine of the United Feldspar and Minerals Corporation has been leased and will be reopened by a new company.

COPPER CLIFF, ONTARIO—International Nickel Company of Canada, Limited has started construction of a \$16,000,000 plant to produce byproduct iron sinter from its nickel smelting. Ultimately 1,000,000 tons of 65.0 percent iron product will be recovered from pyrrhotite.

MOAB, UTAH—Big Indian Mines, Inc. has announced that diamond drilling north of the Mi Vida uranium mine has indicated 375,000 tons of uranium ore at an average depth of 300 feet below the surface.

SALISBURY, SOUTHERN RHODESIA—Minex, Ltd. of Johannesburg, is investigating the Altan-Plum scheelite claims at Mazoe where diamond drilling in 1952 indicated important scheelite reserves.

PORT-AU-PRINCE, HAITI—Reynolds Mining Corporation has started development of its bauxite properties near Miragoane. Plans call for initial production of 750,000 tons of bauxite annually.

DURANGO, COLORADO—The Vanadium Corporation of America's uranium-vanadium mill here has set the record for the largest recovery of uranium during a month's time of all Colorado Plateau uranium mills.

LA PAZ, BOLIVIA—The Bolivian government has signed an agreement to deliver 10,000 tons of tin before March 1, 1954 to the United States government. Price will be New York open market price for tin as of delivery.

MOSCOW, USSR—Steel production in the Soviet Union is scheduled to reach 44,700,000 metric tons by 1955.

LONDON—Imperial Chemical Industries will build a commercial-size titanium metal plant using a new and more efficient process to produce 1,500 tons of titanium sponge per year.

Cal Uranium To Sink Shaft In Big Indian Valley Area

The Cal Uranium Company is sinking a vertical shaft to a depth of approximately 300 feet in the Big Indian Valley area on the rim-flat west of the Big Indian copper mine and two miles north of the Utex Exploration Company's multi-million dollar Mi Vida mine. The shaft will serve as the central hoisting shaft for a series of separate but adjacent ore-bodies.

Named the San Juan, the shaft is being sunk to explore and develop a discovery in Chinle D formation which was located by the United States Atomic Energy Commission in the course of an exploratory drilling program. The AEC discovery on Cal Uranium property led the company to conduct further drilling to determine the size and nature of the ore body. The shaft will be a two-compartment, Cripple-Creek-type cribbed one.

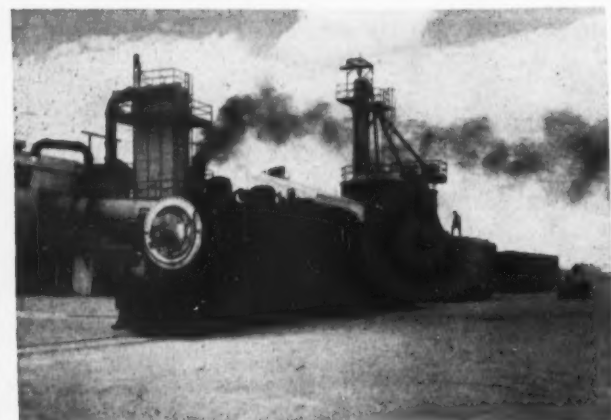
Cal Uranium acquired the claims earlier this year from the Southwest Development Company.

Bancroft Mines Details Its Development Plans

Bancroft Mines Limited plans to spend £6,000,000 by the end of 1955 for development and equipment of the Konkola and Kirila Bomwe ore bodies in Northern Rhodesia. A total of £12,000,000 will be required to bring the mines into production in 1957 or 1958 at a rate of 150,000 short tons of ore monthly and 4,000 short tons of blister copper. £2,900,000 is to be spent on shaft sinking and development, and £1,500,000 on a concentration plant at Kirila Bomwe. Concentrates will be railed from the plant to the Rhokana Corporation's smelter at Nkana, a distance of 55 miles. £3,100,000 will be spent on European and Native townships.

The power requirements of the mines will be met by the Rhodesia Congo Border Power Corporation Ltd. which has recently been granted a loan of \$22,400,000 by the Export-Import Bank in Johannesburg to finance power supplies. (See MINING WORLD, August 1953, page 67.)

A diamond drilling program, carried out by Rhokana was originally started in 1936 and interrupted during the war. A total ore reserve of 76,900,000 short tons was proven, averaging 3.6 percent copper. The Konkola ore body was found to contain 32,900,000 short tons of ore averaging 2.48 percent copper, of which 0.45 percent represents oxides. The Kirila Bomwe North ore body was proved to contain 13,100,000 short tons averaging 4.05 percent copper over 13.5 feet average width. The southern ore body is estimated to contain 33,600,000 short tons averaging 4.52 percent copper over 22.4 feet width.



ABOVE RIGHT: Kaiser Aluminum and Chemical Corporation's new fluorspar concentrator near Fallon, Nevada treats ore from the company's Kaiser mine 70 miles distant and has capacity great enough to treat additional ores should they be developed. An underground hopper at the right receives mine ore trucked to the mill and feeds it to temporary storage bins for subsequent crushing, grinding, flotation, and drying. TOP LEFT: The 70-mile truck haul from the mine to the mill is under contract to the McCutcheon Transportation Company. Two Cummins-powered Peterbilt tractors pulling 20-ton trailers, one a bottom- and one a rear-dump, supply the needed hauling capacity. BOTTOM LEFT: Final dried and cooled concentrate is loaded from the two bins in the right center to cars spotted on the millsite spur of the Western Pacific Railroad.

To insure a steady supply of synthesized cryolite (Na_3AlF_6) for its aluminum plants, Kaiser Aluminum and Chemical Corporation has developed integrated refined-fluorspar production facilities in western Nevada, the first for that state.

The operation, under the direction of Harley Phillips, general superintendent, consists of the Kaiser mine, purchased from H. W. Gould and Company, and a flotation mill erected near Fallon, Nevada by Kaiser. Fluorite concentrate from the Fallon mill is shipped to the Bay Point Works of the General Chemical Division, Allied Chemical and Dye Corporation at Nichols, California where it will be converted to cryolite and shipped to Kaiser aluminum reduction plants.

General mill design was based on experimental work by the Denver Equipment Company and machine layouts and drawings by Western-Knapp Engineering Company. Detailed design and construction were completed in 1952 by the Kaiser Aluminum and Chemical Company on 50 acres of undeveloped land about a mile west of Fallon on U. S. Highway No. 95.

Mill water is produced from a 70-foot well on the mill site and does not pose a problem except that the hardness of the water raises the soda ash consumption in the circuit. Electric power is supplied by a 25-mile, 69,999-volt line from the Lahontan Dam, a part of the Truckee-Carson Irrigation District.

After over six months of steady production at the rate of about 100 tons per day, the mill design is a proved success with steady recoveries of 96.0 percent and concentrate assays averaging 98.6 percent CaF_2 , (well above the 97.0 percent CaF_2 content required of acid-grade fluorspar), 0.6 percent SiO_2 , 0.4 percent carbonates, 0.2 percent iron and aluminum oxides, and 0.2 percent made up of traces of moisture, organics, sulphides, etc.

The mill, the operation of which is directed by mill superintendent Walter Johnson, is made up of four component sections: crushing, primary and secondary; grinding, in closed circuit with a classifier; flotation; and dewatering, composed of thickening, filtering, and drying.

Crude ore from the mine is

trucked 70 miles to the Fallon mill under contract by the McCutchen Transportation Company of Huntington Park, California. Two tractor-trailer units each with a 20-ton capacity are employed. Both are Cummins-Diesel-powered Peterbilt trucks with Freuhauf fifth wheels. One pulls a Utility bottom-dump trailer and the other a Cook Brothers rear-dump trailer.

Crushing Plant

Ore is dumped from a ramp through a rail grizzly to an underground 30-ton concrete hopper. A 30- by 6½-foot Stephens-Adamson reciprocating plate feeder unloads the hopper to a 24-inch belt conveyor leading 160 feet to a 200-ton temporary storage bin ahead of the crushing section.

A second S-A feeder passes the coarse ore to a 24-inch belt conveyor carrying a Stearns magnetic head pulley to guard crushing equipment from damage to tramp iron. The conveyor passes ore over a grizzly with 2-inch openings to a 10- by 20-inch Pacific jaw crusher set at 2 inches. Grizzly undersize



KAISER MILLS NEVADA FLUORSPAR

A new mill typical of other modern Kaiser facilities has been completed near Fallon, Nevada to insure raw materials supply to cryolite producers

joins crusher discharge on a third 24-inch belt conveyor that leads 10 feet to a 25-foot center-to-center chain elevator carrying buckets 8 inches by 5 inches. The elevator discharges on a 3- by 6-foot Overstom vibrating screen that feeds the plus- $\frac{1}{2}$ -inch fraction in the crushed ore to a 22-inch Symons cone crusher. Undersize joins cone discharge on another 24-inch belt conveyor that carries the material by a No. 1 Den-

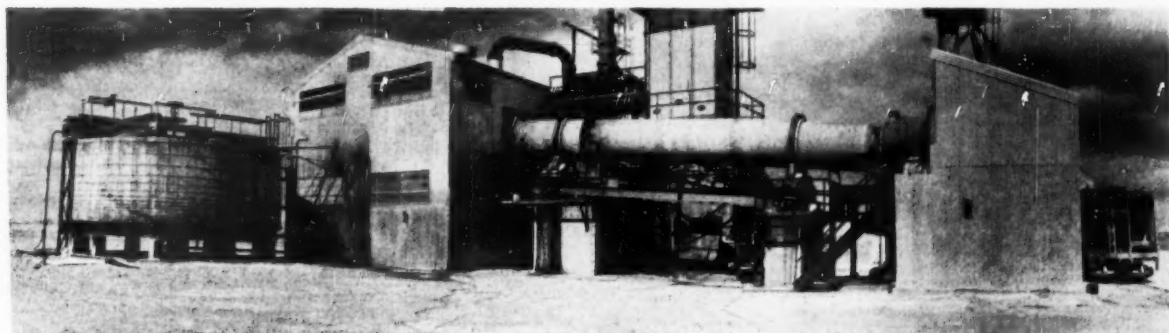
ver type SL automatic pulp sampler to a second bucket elevator that rises 51 feet to a 200-ton crushed ore bin.

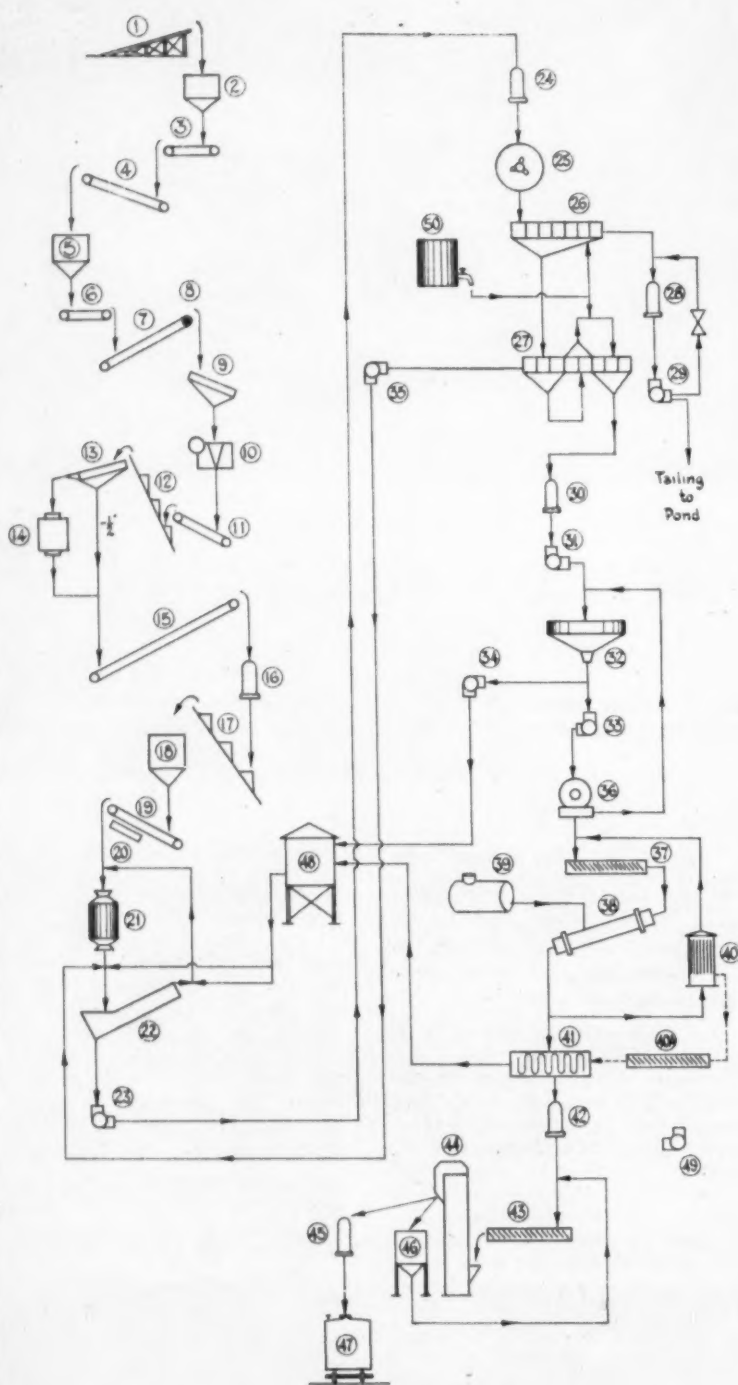
Reagents

From the crushing section, a 20-inch by 18 $\frac{1}{2}$ -foot belt feeder conveys ore over a Hartshorn belt weight meter to a 5- by 5-foot Denver ball mill operating in closed circuit with a 30-inch by 17 $\frac{1}{2}$ -foot

Wemco SH classifier. Ball consumption averages 1.0 pound per dry ton of feed. Ore is pulped in the ball mill with 25 gallons of water per minute and conditioned with 3.10 pounds of soda ash, dissolved in hot water, per ton of dry feed. Much of this soda ash is required to soften the hard make up water before flotation; the remainder is added to maintain a pH of 9.5 in the flotation rougher section. Classifier overflow,

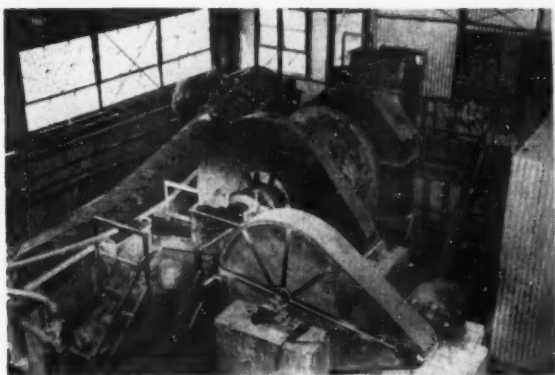
From the flotation section housed in the building on the left, concentrate is fed to the dewatering and drying circuits, the final unit of which is the long kiln in the center.



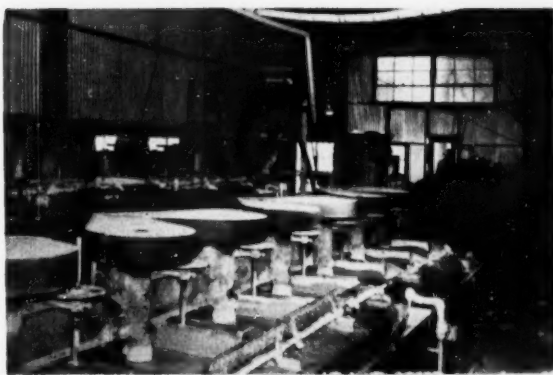


No	DESCRIPTION
1	Ramp
2	30-Ton Hopper
3	30'x6'-6" Recip. Plate Feeder
4	24'x160' Belt Conveyor
5	200 Ton Bin
6	30'x6'-6" Recip. Plate Feeder
7	24'x34'-7½" Belt Conveyor
8	Stearns 24'x24" Magnetic Pulley
9	Grizzly
10	10'x20" Pacific Jaw Crusher
11	24'x10' Belt Conveyor
12	Chain Elevator 8'x5' Buckets-25 c/c
13	Overstrom 3'x6' Vibrating Screen
14	22" Symons Cone Crusher
15	24'x32'-4" Belt Conveyor
16	No 1 Denver Auto. Pulp Sampler
17	Chain Elevator 8'x5' Buckets-51 c/c
18	200 Ton Bin
19	20'x18'-7" Belt Conveyor Feeder
20	Wartshorn Belt-Meter
21	5'x5' Denver Ball Mill
22	30'x17'-6" Wemco S-H Classifier
23	2" Wemco Centrifugal Sand Pump
24	Denver Auto. Pulp Sampler
25	Wemco Conditioner-16" Propeller
26	8 Cell No 18 Spec. (32x32) Flotation Mach.
27	8 Cell No 18 Spec. (32x32) Flotation Mach.
28	Denver Auto. Pulp Sampler
29	1½" Wemco Centrifugal Sand Pump
30	Denver Auto. Pulp Sampler
31	2" Wemco Centrifugal Sand Pump
32	Thickener
33	Pump
34	Pump
35	1½" Wemco Centrifugal Sand Pump
36	4' Diam x 5' Denver Drum Filter
37	Screw Conveyor
38	Drier
39	Fuel Tank-12,000 Gal.
40	Dust Collector
40A	Screw Conveyor
41	Cooler
42	No 1 Denver Auto. Pulp Sampler
43	Screw Conveyor
44	Bucket Elevator-8'x5' Buckets
45	No 1 Denver Auto. Pulp Sampler
46	Concentrate Storage
47	Railroad Cars
48	Steady Head Tank-20,000 Gal.
49	Fresh Water Pump
50	Reagent-Mixing, Feeding & Storage

KAISER ALUMINUM & CHEMICAL CORPORATION
FLUORSPAR MILL
Fallon, Nevada



The grinding circuit at Kaiser's Fallon mill is composed of a Denver ball mill and a Wemco 5H classifier operating in closed circuit. Soda ash is added in the ball mill to soften the hard, fresh make-up water and bring the pH to 9.5 before the pulp reaches the rougher section in the flotation circuit.



The flotation section is made up of two banks of eight No. 18 special Denver "Sub A" flotation cells; one forms the rougher circuit and one the cleaner. Other than soda ash, the flotation reagents include sodium silicate, oleic acid, and Emcol X-25.

to which is added 1.20 pounds of sodium silicate per dry ton of pulp for further conditioning, is transferred through a second Denver sampler to a Wemco conditioner by a 2-inch Wemco centrifugal sand pump. Before passing to the flotation section, 2.50 pounds of oleic acid and 0.25 pounds of Emcol X-25 per ton of dry feed are added to the pulp in the conditioner.

Flotation Circuit

Conditioned pulp is fed to the first cell in a bank of eight No. 18 special 32- by 32-inch Denver "Sub-A" flotation cells that form the rougher section in the flotation circuit. Before discharge to the tailing pond as final plant tailing, underflow from the roughers is sampled in a third No. 1 Denver type SL automatic pulp sampler. Transfer to the pond is controlled by a 2-inch Wemco centrifugal sand pump.

Froth product from the roughers is fed to the sixth cell in an eight-cell cleaner circuit identical to the rougher section. Froth from the sixth, seventh, and eighth cells goes to the third cell and froth from the third, fourth, and fifth cells is carried to the first cell in the circuit. Cleaner tailing is returned to the classifier in the grinding section by a 1½-inch Wemco centrifugal sand pump. Froth from the first two cells in the cleaner circuit forms the final flotation concentrate.

Flotation feed, concentrate, and tailing each are sampled with Denver automatic pulp samplers. A two-inch Wemco centrifugal sand pump feeds the sampled concentrate to a thickener at the head of the dewatering section. Thickener overflow is pumped back to the 2,000-gallon steady head tank that furnished the pulping water in the

grinding circuit and the under-flow is pumped to a 3-foot by 4-foot-diameter Denver drum filter. Water from the filter is returned to the thickener and underwatered concentrate is screw-conveyed to a kiln for drying. Concentrate fines carried off with the gases discharged from the kiln are recovered in a Western Precipitation multicone and bag dust collector and either returned to the screw conveyor feeding the kiln or combined by an auxiliary screw conveyor with the kiln discharge. Kiln operation requires 3.8 gallons of fuel oil for each dry ton of material handled.

After transfer through a Western Precipitation cooler, the dried concentrate is again sampled by a Denver automatic pulp sampler and screw-conveyed to a bucket elevator that carries the finished product to one of two storage bins built adjacent to the railroad spur to await shipment to the Nichols, California plant where it is converted to cryolite. Concentrate loading is so arranged that rail cars can be loaded directly from the elevator or con-

centrate can be transferred from the storage bins to the screw conveyor feeding the elevator and thence to the rail cars. A final sample of the concentrate is taken by a Denver automatic sampler as the material is loaded in the cars for shipment.

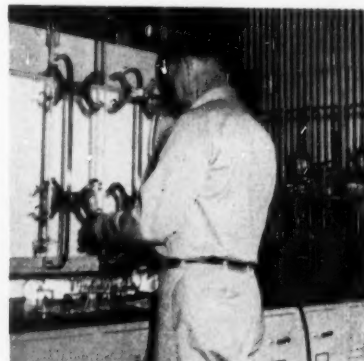
Testing Laboratory

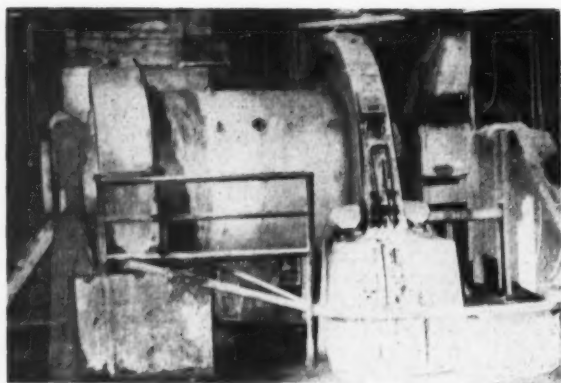
Sampling and assaying forms the basis for control data throughout the mill. Purity of concentrate must be maintained to insure the production of a useable product, and high recovery, of course, is the mark of plant efficiency and must be maintained to insure the lowest possible plant costs. The completely equipped, modern testing laboratories at Kaiser's Fallon mill are under the direction of G. L. Frayser who has developed the methods and equipment used to make the difficult and exacting assays that fluorspar requires. His adaption of the Willard-Winter assay method has been based on years of experiments and experience in fluorspar analysis.

Walter Johnson is superintendent of Kaiser Aluminum and Chemical Corporation's Fallon fluorspar mill.

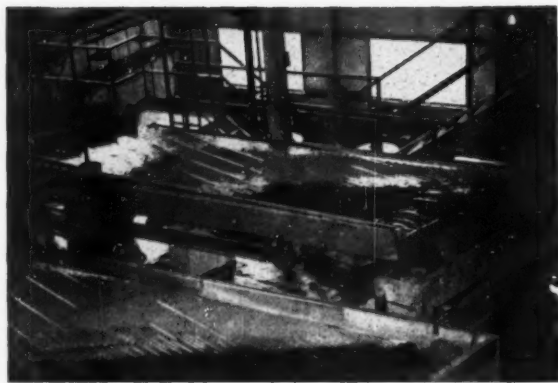


G. L. Frayser directs the operation of the modern testing and assaying facilities in the mill laboratories.





This new Marcy 4- by 6-foot rod mill has peripheral discharge and was selected to minimize overgrinding.



Eight rougher tables, Diester SuperDuty Diagonal Deck No. 6, are in the same section of the mill with the Conenco classifiers. With closely sized feed, each table is adjusted especially for the size range it receives.

TUNGSTEN MINING CORPORATION'S

By Howard L. Waldron*
and
Lewis J. Walters**

Increased production (from 300 to 650 tons daily), an important increase in recovery, and a new flexibility of operation—all of these were achieved in Tungsten Mining Corporation's newly expanded mill. In effect, the expansion included so many changes and additions that it created a new mill. Yet, engineered the way it was, the expansion did not interrupt existing production.

In the new mill, production of slimes has been kept to a minimum:

Immediately after being ground to $\frac{1}{4}$ inch, ore passes through a jig circuit, which effects about

John Hamme, mill superintendent. While attending school in Salt Lake City, Utah, he identified the black-and-white rock his brothers found as "huebnerite in quartz."



50 percent of the recovery without further grinding of huebnerite or scheelite. Peripheral-discharge rod mills were chosen to minimize overgrinding. As mill superintendent John Hamme says, "evidence to date indicates that they are doing about the same metallurgical job as the rolls, and they have a great many operational advantages."

Slimes which are produced are largely recovered in a new section of the mill:

These slimes are first thickened in a bank of three 20-inch Centriclones which make a split at approximately 15 microns. Primary recovery then takes place in a battery of Denver-Buckman tilting concentrators. Upgrading on conventional Deister Concentrator Co. tables then makes a product suitable for the flotation circuit. Largely through the minimum of overgrinding, and through recovery of slimes, the overall tailing loss has been reduced appreciably.

Among the other new or interesting techniques:

The fine-ore bin is a suspension bunker type—built of steel plates riveted together and suspended in a catenary curve. A Conenco 8-spigot hydraulic classifier sends eight size ranges

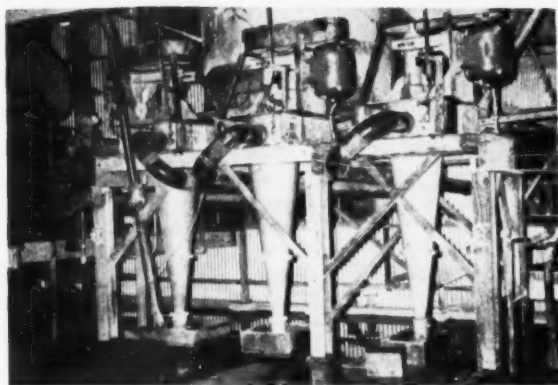
of products—one to each of the eight rougher tables. Concentrate is dried under a battery of infrared bulbs.

Integrate New and Old

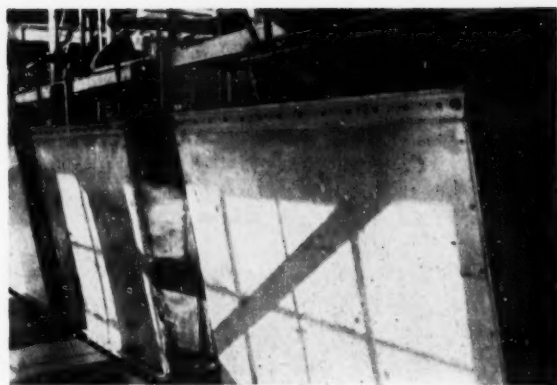
Three concerns cooperated to bring the plant up to its new performance and capacity: Tungsten Mining Corporation worked out most of the metallurgy; key man was mill superintendent John Hamme. The Industrial Division of Southwestern Engineering Company (Los Angeles, California) did engineering design, specification, and procurement of equipment and materials; Herbert V. Hughes is manager of the Industrial Division, and project engineer on the job was Lewis J. Walters. Southeastern Construction Company (Charlotte, North Carolina) did the construction work; Ray H. Seagers was construction superintendent on the job.

Southwestern Engineering placed major emphasis on complete integration of the existing plant and the additions. For example, the footings of the new crushing plant had to be carefully designed, both for clearance and soil pressures, to avoid interference with the existing (parallel) crushing plant. The old crusher plant was shut down as soon as the

* New York district manager MINING WORLD.
** Project engineer for Southwestern Engineering Company in the expansion of Tungsten Mining Corporation's mill. He is a graduate of London University (M. E.) with many years experience as chief designer and design engineer for some of the largest copper companies in the United States.



Three Centriflones make a slime product split at approximately a 15-micron size range. Overflow is fed to two thickeners for further recovery of solids. Underflow is thickened product for important slime recovery in the Denver-Buckman table section.



When Denver-Buckman tables finish a concentrating cycle, feed automatically is cut off, table surfaces tilt upward, and water jets wash concentrate into collecting launder.

EXPANDED MILL . . .

. . . . Takes advantage of some of the best new techniques in gravity milling

new was completed; the old one is now a standby, and can be used to help maintain production at any time the new one is shut down.

Another example of this integration was the fine-ore storage system. Southwestern had been assigned the job of designing a new storage bin with capacity for a full day's operation; it had to locate the bin so that it could work with either the old or new crushing plants without interrupting operation of the mill.

The old storage system consisted of two timber bins, each 16 feet in diameter and 18 feet high. SWECO chose the site of the old bins as the best site for the new bin; because of limited space and headroom, it chose the suspension-bunker bin as the best type. It gives maximum live storage in a minimum of space, and, since the ore is sticky, the live storage of any type of bin is cut down considerably.

The new suspension bunker bin was to be long (46 feet) in comparison to span (19 feet), and it was to be placed along the line of centers of the two old bins.

In a planned sequence, workmen tore down the south timber bin; erected the south half of the new suspension bin; fitted it with an ore-holding diaphragm on the north end; and connected feed and removal systems to this half ore bin. Then they removed the north timber bin; completed the suspension bunker bin. The entire change did not interrupt operations.

NOVEMBER, 1953

The truck-dump grizzly consists of 75-pound rails, assembled in inverted position. Two-thirds of the grizzly area slopes at 5 inches in 12; the remaining one-third is horizontal. As ore is dumped, it hits this sloping section, the fines fall through, and ore to be broken comes to rest on the horizontal portion. At the end of the horizontal run, stops keep large lumps off a grizzlyman's catwalk which runs the length of the bin.

The coarse-ore bin (150-ton) is wedge-shaped, and lined with flange-down 40-pound rails.

Plate feeders on the 300-ton ore bin are equipped with adjustable throw and individual drive so they can work over a wide range of capacities.

Lewis J. Walters, Southwest Engineering Company's project engineer for the Hamme mill expansion.



The shuttle over the suspension-bunker ore bin has fully automatic control for both travel and direction of feed; it provides uniform loading for the entire 46-foot length of the bin.

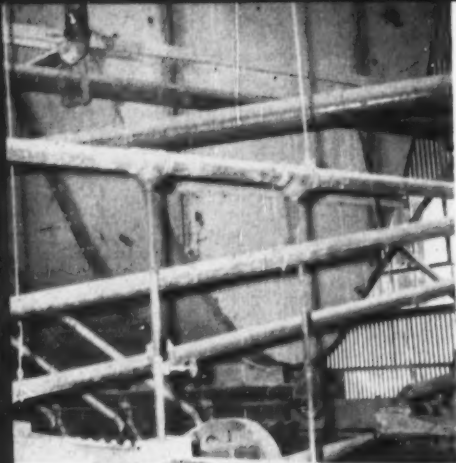
Full electrical interlocking protects the crusher plant and shuttle.

The suspension-bunker ore bin is a free-hanging tensional structure. SWECO's engineer used Ketchum's formulae for catenary curves in its design. Plates are $\frac{3}{8}$ inch, riveted together. Inside the plates, the bin was lined with a 2-inch layer of gunite reinforced with wire mesh. Trimix admixture was used in the gunite, and a Lapidolith surface hardener was applied on the inside. Eleven 16-by 16-inch bottom openings are protected by renewable

Herbert V. Hughes, manager of Southwestern Engineering Company's Industrial Division.



[World Mining Section—31]



Suspension-bunker ore bin holds 600 live tons of minus- $\frac{1}{2}$ -inch ore. It serves as the main surge bin, and allows crushing plant to operate 16 hours daily while the mill operates 24.

protectors which are placed over the gunite to take the wear.

Vane feeders (Stephens-Adamson) were chosen from a variety of types for the suspension-bunker bin. They won out because they best met the space and cost requirements. Ore flows to each feeder through a thimble bolted to the bin, through a manually operated rack-and-pinion shutoff gate, to the open-type Vane feeders which have a regulating gate ahead of the vane. Each feeder has its own ratchet drive. They are driven through two reciprocating shafts, both of which are powered through variable speed drive by a 5-horsepower motor.

Avoid Sliming

Briefly, the metallurgy (see flow-sheet) consists of crushing to $\frac{1}{2}$ -inch, rod-milling to $\frac{1}{8}$ -inch, jigging, rod-milling to 0.07-inch, tabling, bulk flotation to remove sulphides, drying, and magnetic separation. Working to recover extremely fine tungsten from three extremely dilute overflows is the new slime-recovery section.

The new crushing and storage system takes care of feed for the entire mill; the old one is held in standby. At the splitter (see note on flowsheet), the feed is divided into two halves. Each half is jigged and rod-milled in an identical circuit, and each half is classified in separate Denver rake classifiers for treatment in the two tabling circuits.

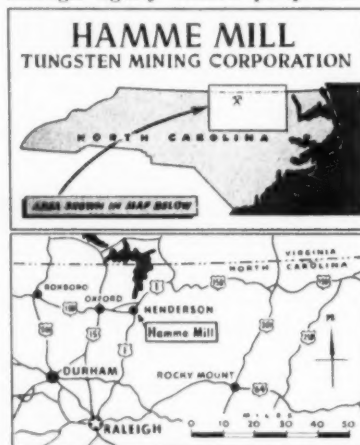
Particles of huebnerite ($MnWO_4$) in the ore are fairly large, and a recovery near 100 percent is possible at the 0.07-inch size of grinding. But the huebnerite crushes quickly and easily to fines and slimes, whereas the white quartz matrix is

hard—a grinding medium in itself. To minimize production of slimes, ore is screened or classified before every crushing or grinding step.

Next, although it is not completely liberated, the ore at $\frac{1}{8}$ inch goes to the two Bendelari jigs. They recover about 50 percent of the tungsten in a product that is high grade (60 percent WO_3 or better).

Tailing from the jig circuit is screened at 0.07-inch, and the coarse portion then goes to 4- by 6-foot rod mills. John Hamme, mill superintendent, describes the change from the use of rolls to the use of rod mills as, "one of our major changes in the mill flowsheet."

For grinding to 0.07-inch size, Marcy peripheral-discharge rod mills were chosen to replace crushing rolls which had been used in the previous plant. The rolls had been doing a good metallurgical job, but were sources of dust and were troublesome mechanically. Fast flow through lightly loaded peripheral-



discharge mills reduces sliming and produces a satisfactory range of product.

The feed system to the two 4- by 6-foot rod mills and the 3- by 8-foot rod mill on middling regrind is arranged so that when one mill is out of service, the other two with the rolls can keep the mill going at capacity.

Partially deslimed jig tailing goes to a Conenco (Deister Concentrator Co.) 8-spiгот hydraulic classifier. It produces a sized feed for each of the eight tables. The coarsest of these eight products (from No. 1 spigot) goes through a 12-inch Crangle jig before going to No. 1 table. Products from the Nos. 2 to 8 spigots go directly to respective rougher tables.

Three products from each of the eight tables (Deister Concentrator Co., Super Duty No. 6s) flow by gravity to Wilfley pumps in a con-

crete tunnel below the centerline of the two banks of tables; that arrangement allows for easy access and repair, and provides gravity feed to the sand pumps. The launders are rubber-lined lumber.

Table concentrate is pumped to a storage tank, from which it is removed periodically for a batch bulk float to remove sulphides. After filtering and drying, it is then ready for magnetic separation into final products.

Table middlings are pumped to the 3- by 8-foot open-end regrind mill, and then returned to the tabling circuit.

Tailings are sampled and sent to waste.

Recover the Slime Values

Despite every precaution in grinding and handling, an important amount of huebnerite and scheelite ($CaWO_4$) ends up in the slime range (approximately 250-mesh to 15 microns). The new slime circuit recovers all but a small portion of these slimes. As John Hamme says, "we're making a good tailing in this slime section, and we believe we can cut losses even further."

Briefly, it works by thickening an extremely dilute product in Centriclones, recovering the product in two banks of Denver-Buckman tilting concentrators, and upgrading it on Deister No. 6 tables.

Three 20-inch Centriclones (Equipment Engineers, Inc.) thicken the slime by making a split at about 15 microns; below that size, there is an almost negligible weight of tungsten. The three are doing a job that John Hamme calculates would require a thickener 60 feet in diameter. The overflow from the centriclones is fed to the two thickeners of the old mill (20 and 24 feet in diameter); there some further recovery of solids is made.

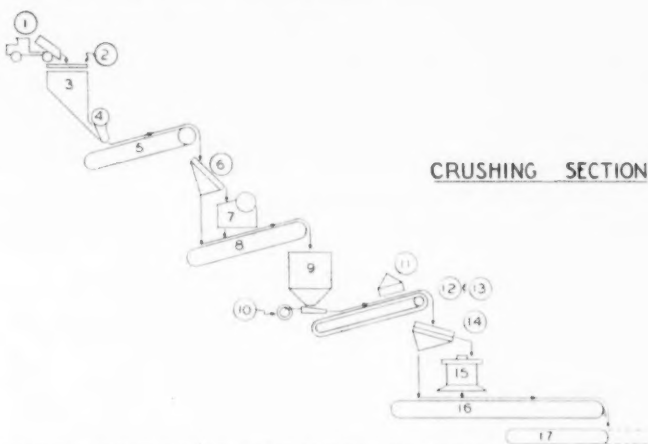
This Merrick Type S Weightometer is approximately one-third of the way from the tail of a 20-inch belt. It keeps a continuous weight record.



Flowsheet of Tungsten Mining Corporation's 650-Ton Gravity Tungsten Mill Henderson, North Carolina

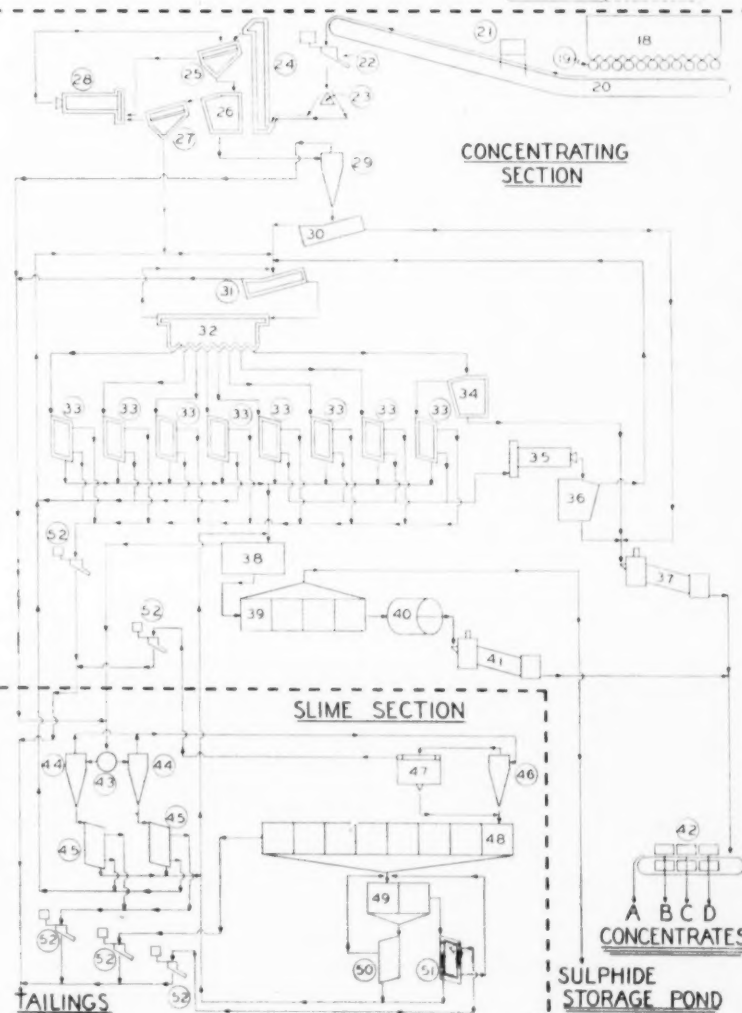
Crushing Section

1. Ore trucks from mine.
2. Rail grizzly, 12-inch spacing.
3. Coarse ore bin, steel, 150 tons.
4. Chain feeder, Ross No. 5.
5. Belt conveyor with Dings electromagnetic head pulley.
6. Grizzly set at 2 inches.
7. Jaw Crusher, Birdsboro-Buchanan, 18 by 36 inch.
8. Belt Conveyor, 30 inch.
9. Ore bin, 300 tons circular steel.
10. Plate Feeders (2), reciprocating type. (Flowsheet units with double lines represent two such units in mill)
11. Dings suspended magnet.
12. Conveyor with Dings permanent magnet head pulley.
13. Conveyor with Dings suspended magnet (11).
14. Vibrating screen, Robins-Elliott, 60 by 126 inches, set at 1/2 inch.
15. Cone crusher, 3-foot Symons shorthead, set at 3/4 inch.
16. Conveyor belt, 18 inch.
17. Shuttle conveyor, 18 inch.



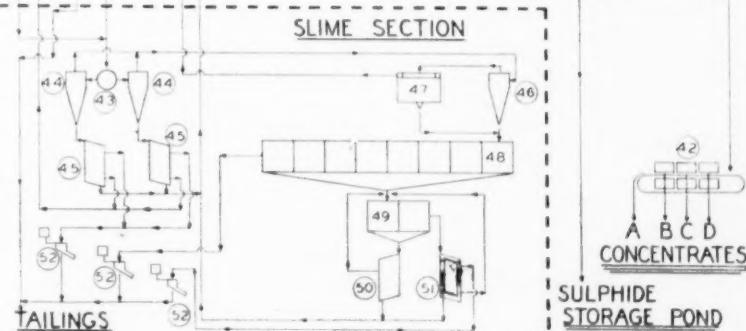
Concentrating Section

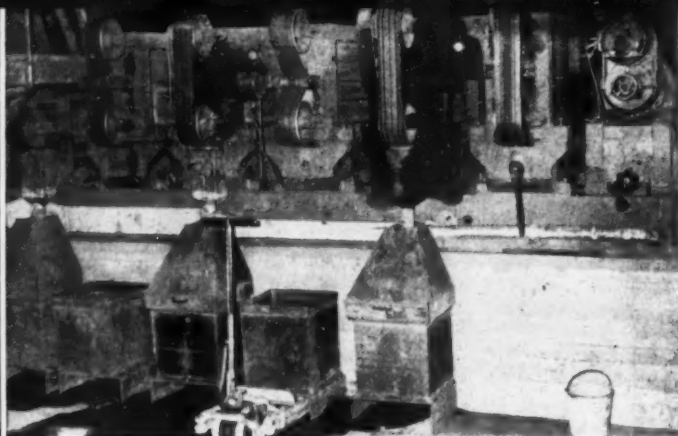
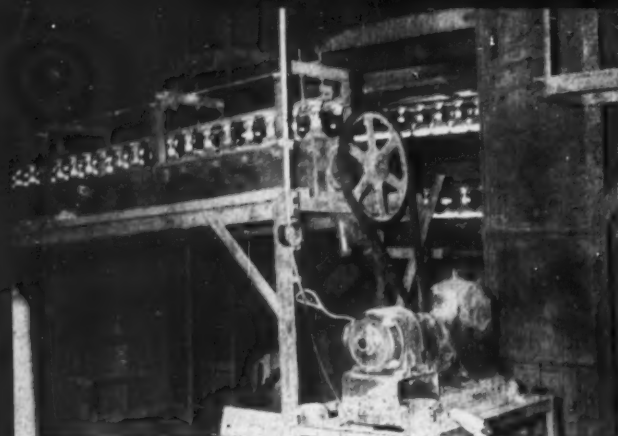
18. Ore bin, 600-ton suspension.
19. Rotary Vane Feeders, SACO, 12 by 16 inch.
20. Belt conveyor, 20 inch.
21. Merrick Type S Weightometer.
22. Geary-Jennings automatic sampler.
23. Splitter.
24. Bucket elevators (2).
25. Vibrating screens, double-deck Hummer at 1/4 inch (2).
26. P-delari jigs, one cell, 36 by 36 inch (2).
27. Vibrating screens, 4- by 8-foot Hummer at 0.07 inch (2).
28. Rod mills, Marcy 46 with peripheral discharge (2).
29. Cone, 3-foot.
30. Classifier DECO, cantilever type.
31. Classifier DECO 4- by 25-foot, Simplex rake (2).
32. Hydraulic classifier, Concenco, 8-spigot (2).
33. Rougher tables, Diagonal deck No. 6 Deister Concentrator Company, separate size feed to each (2).
34. Triangle jig for No. 1 (coarse) spigot discharge (2).
35. Rod mill (middling regrind), Marcy 38.
36. Jig, 26 inch.
37. Dryer, coarse jig concentrate.
38. Storage tank, table concentrate.
39. Denver "Sub-A" flotation machine 18-inch cells to remove sulphides.
40. Filter, Dorco, 3- by 8-foot.
41. Dryer, flotation concentrate.
42. Magnetic separator, Dings, 6-pole, cross belt.



Slime Section

43. Splitter.
44. Cones, 8-foot diameter.
45. Tables, Deister Concentrator Company, No. 6.
46. Centrifuges, three 20 inch.
47. Thickeners, one 20-foot, one 24-foot.
48. Denver-Buckman tilting tables, eight 6 by 6-foot.
49. Denver-Buckman tilting tables, two 6 by 6 foot, (cleaners).
50. Table, Deister Concentrator Company, No. 6.
51. Tables, Deister Concentrator Company, No. 6 (2).
52. Automatic samplers.
- A. Scheelite concentrate.
- B. Huebnerite concentrate.
- C. Middling (contains rhodocrosite).
- D. Iron.





LEFT: Infrared concentrate dryer consists of a screw conveyor which moves concentrate slowly under bank of infrared bulbs. Big advantage: low heat does not make sulphides magnetic and no dust is produced. RIGHT: Dings 6-pole, cross-belt, magnetic separator makes four products: iron, a middling product containing rhodochrosite, huebnerite, and scheelite. The unit allows for carefully regulated separation.

Ten Denver-Buckman tables (Denver Equipment Co.) are arranged in two parallel banks. Each consists of four rougher tables and one cleaner. Buckman, working at the Sullivan mine in British Columbia, designed these tables around the facts that slime tables required a flat surface on which water flow was relatively slow; that this meant a large total table area per unit of feed; and that he had to provide some means for removing settled slimes. He provided area by stacking light tables above one another; he provided for concentration and removal by making the table operate first in a slightly tilted, and then in a steeply tilted position. Banks of tables are operated from a central cam system—a "brain". They start a cycle in the nearly horizontal position, and the cam system turns on feed to each deck. After a concentrating period, the feed shuts off, the tables automatically tilt upward into washing position, and a stream of jets automatically washes collected concentrate into a separate launder. Then, the washing stream cuts off, the decks return to nearly horizontal,

and the feed comes on again.

Dry by Infrared Heat

Tungsten Mining Corporation has what are probably the world's first infrared concentrate dryers. They were chosen because they are compact, fairly cheap to run (about \$2.00 per concentrate ton), require little supervision, and most importantly because they do not make iron sulphides magnetic (in which state they would interfere with magnetic separation). Also, they require little maintenance and produce a minimum of dust. One of the two dries concentrates from the jigs; the other concentrates from the tables via bulk flotation. Each has a capacity of about 0.3 ton per hour. Each is equipped with 70 General Electric 375-watt infrared bulbs; so total power consumption for both dryers is 52.5 kw, or 87.5 kw per ton.

The dryers consist of a U-shaped channel in which a screw conveyor slowly churns the concentrate toward the ejection end. Above the channel the infrared bulbs are arranged in two rows so that the bottoms clear the concentrate by about one inch. The bulbs are open to the air. They dry by radiation,

not by space heating.

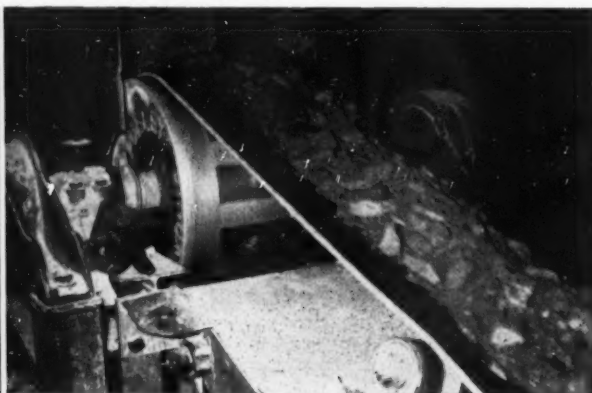
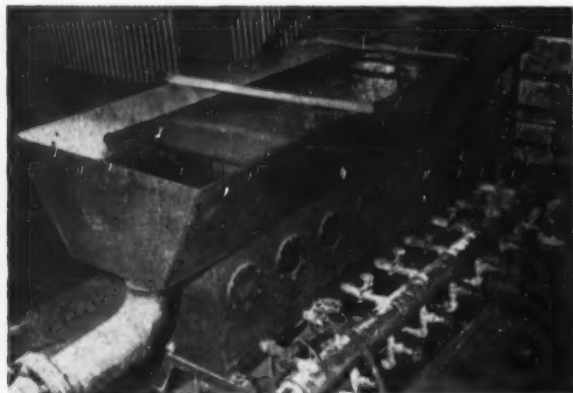
Separate, Bag, & Ship

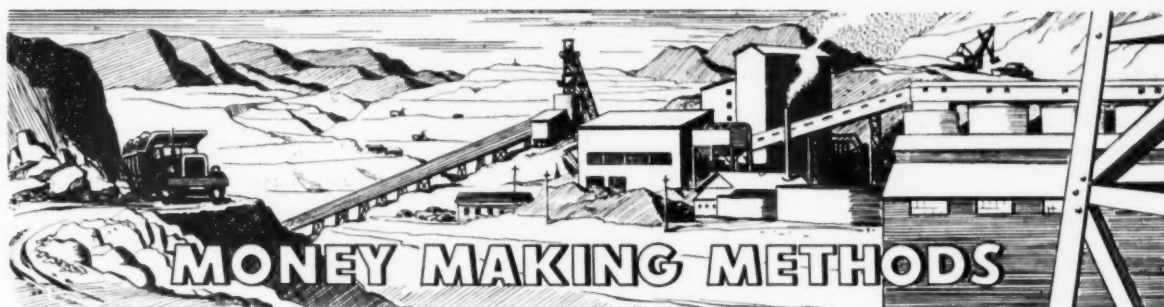
Dried concentrate goes to a 6-pole Dings cross-belt magnetic separator. It makes four products. An iron product is made and is stored for future treatment. A middling product contains some rhodochrosite, some sulphides and huebnerite; it is bagged separately for shipment to Wah Chang Trading Corporation. Scheelite concentrate which does not meet market specifications is also shipped to Wah Chang Trading Corporation for upgrading. Huebnerite concentrate, the principal product averaging about 72.0 percent WO₃, has been sold mainly to General Electric Company.

Bagging and weighing is a batch process. Each type of product is bagged in a distinctive bag, 100 pounds to the bag. Huebnerite, the heaviest and richest, requires the smallest bag.

Figures on tungsten production of the major companies are an industrial secret. But at more than 10,000 units per month from its own mine, Tungsten Mining Corporation mines more than any other domestic company.

LEFT: Ready for tabling, the ore (ground to minus-0.07-inch) is classified hydraulically into eight closely sized products in this Concenco 8-spigot classifier. RIGHT: First magnetic protection comes when ore flows from primary storage bin. Here, on this 36-inch storage belt, a Dings electro-magnetic head pulley removes tramp iron ahead of the primary crusher.

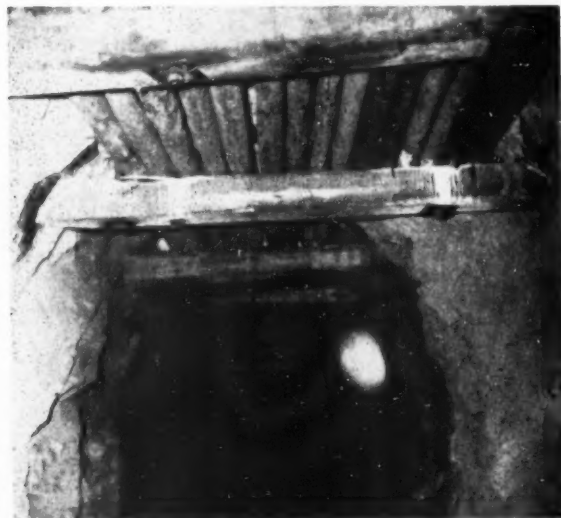




TIMBER BOLTS HOLD BACK IN ONTARIO BASE METAL MINE

A large base metal mine in northern Ontario, Canada has found use of roof bolts to be advantageous in holding timber against the back to prevent caving, as shown in the photograph.

In the crosscut, timbering was required to hold the back, so 8 by 8 inch caps were bolted to the back on 5-foot, 4-inch centers with 6-foot-long Foran expansion



Two Foran expansion bolts hold each cap in place in this crosscut.

bolts—two to a cap. Three-inch round lagging was then used on top of the caps to prevent any small rock from falling.

Timber bolting was carried very close to the face but no perceptible movement was detected after each round was blasted.

SPIRALS ON BIT AND DRILL ROD

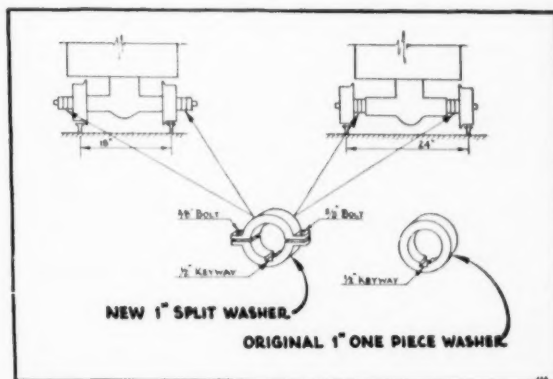
A new detachable rock bit with a variable number and pitch of spiral ridges on it has been developed. The same spiral pattern is available on spiral extension drill rods. The spiral starts just below bit teeth with a deeper than normal groove cut between the teeth to permit free passage of cuttings to the spiral. Bit and spiral are made from the same piece of steel.

The rotation of the bit and rod turns the spiral in the same direction to screw all cuttings away from bit and to prevent binding.

NOVEMBER, 1953

SPLIT WASHERS SPEED TRAMMER GAUGE CHANGES

On a popular make of 1½-ton mine trammer, a means is provided for changing the gauge of the wheels to fit any track width from 18 to 24 inches. The change can be made by shifting the position of 1-inch-thick washers on the axle to the desired side of the wheel. However, to change from, say, an 18-inch to a 24-inch gauge all the wheels must be pressed off in order to be able to place the washers on the correct side of the wheel. This is no small job for a small mine.



A progressive Idaho mine service firm has evolved the method of using split washers, as illustrated in accompanying diagram, to facilitate these gauge changes. The washers can be easily removed or replaced. It is not necessary to take the wheel off as it can be heated and then easily moved along the axle to its new position.

ELECTRIC ROTARY DRILLING TEST

Electrical rotary drilling tests recently made in a limestone mine in Norway indicate a faster rate of penetration in medium to hard limestone than with a 40-pound pneumatic jackhammer.

Using a standard 50-cycle, heavy-duty Victor Products (Wallsend) Ltd. drill, the following results were obtained: The drill was mounted on a feed bar fixed on a steel post and fed by a ratchet-operated force-feed mechanism. The 1½-inch bits were mounted on diamond sectioned drill rods. Two rotation speeds were used, i.e., 120 and 410 revolutions per minute. The higher speed was best for the rock, and speeds of penetration were from 12 to 16 inches per minute compared to 11 inches for the jackhammer.

[World Mining Section—35]

47

This is the first of a special series of articles on African cobalt mines and treatment methods. Cobalt is both a jet age and atomic age metal. Its atomic usefulness has just begun as Cobalt-60 is the most powerful and generally useful radioactive material available for industrial research. This series is therefore of significant timeliness.

FROM

Cobalt has been literally jet-propelled into fame during recent years and has been in short supply for some time, despite all-out efforts to increase production.

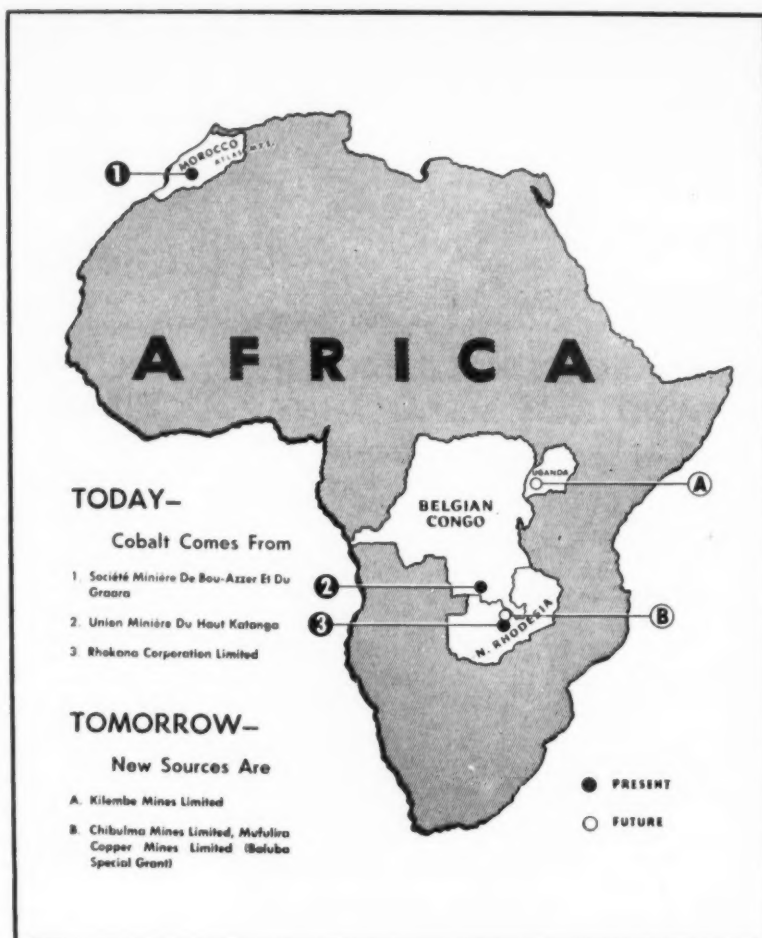
Excluding Russian sources, 90 percent of the world's cobalt comes from Africa, especially the Belgian Congo where a single producer—Union Minière du Haut Katanga—accounts for nearly $\frac{3}{4}$ ths of the world total. Output is being stepped up by Union Minière, while to the south across the border in Northern Rhodesia, Rhokana Corporation Limited also expects increased production as its new plant comes into service.

The Societe Minière de Bou Azzer et du Graara increased production of cobalt concentrate to a record 10,000 tons in 1952 from its mines in French Morocco. The firm mines and concentrates skutterudite (Co. Ni)As, ore.

The long-range picture in Africa is equally encouraging for at least two new, large, copper-cobalt orebodies are being developed: Chibuluma Mines Limited in the Northern Rhodesian copperbelt, and Kilembe Mines Limited, as far afield as the slopes of the Ruwenzori Mountains, in the British Protectorate of Uganda. Other Rhodesian deposits, such as that known as "Baluba," are of a similar nature and consideration is being given to their development also. Baluba reserves are 37,000,000 tons assaying 2.40 percent copper and 0.18 percent cobalt.

The Kilembe orebody, similar in nature to the Rhodesian deposits so far away, opens up speculative possibilities that additional districts will be located in this vast continent, which can hardly be said to be fully explored.

Metallurgically, the central African cobalt deposits—associated, of



course, with copper—are of wide interest because both oxidized and sulphide ores are encountered; in addition, there is a considerable range in cobalt content of the Congo orebodies. These factors have resulted in the application of several different extraction processes. Rhodesian methods are being altered, with introduction of additional methods probable. Since deposits are quite different in size and nature from the smaller deposits previously known in other countries, original chemical and engineering problems have had to be solved. Congo metal recoveries are now comparatively high and Rhodesian recovery shows a marked increase as the new plant operates on a routine basis.

Belgian Congo Ores

An outline of cobalt extraction plants and processes is shown. Currently, ores are oxidized but sulphides will be eventually encountered at depth. Mining emphasis to-

day is near the western extremity of Union Minière's great concession and earlier sources of cobalt are much less important. Cobalt production has shown a five-fold expansion during the last decade and has been, generally, in step with increasing tonnages from the "Western Mines"—extensive opencuts, up to 300 feet deep, located in the vicinity of the rapidly growing town of Kolwezi at an elevation of 5,000 feet above sea level.

These mines occur in a much disturbed sedimentary complex of probable pre-Cambrian age and, as usual in the Katanga oxidized deposits, contain a high proportion of alteration products such as silicates and clay. Much of the ore gangue consists of schists with up to 20 percent alumina. There are both copper mines and copper-cobalt mines, cobalt being invariably associated with copper though copper minerals do not necessarily carry cobalt. The most important copper-cobalt mine is that known as Musonoi which ac-

counts for 25 to 30 percent of Union Minière's copper output and about 90 percent of its cobalt.

The cobalt minerals are heterogenite ($\text{CoO} \cdot 2\text{Co}_2\text{O}_3 \cdot 6\text{H}_2\text{O}$) and lampadite (variable, hydrated manganese and cobalt oxides); copper is present chiefly as malachite [$\text{Cu}(\text{OH})_2 \cdot (\text{Co})$] and, to a smaller degree, ooues, chrysocolla ($\text{CuS} \cdot \text{O} \cdot 2\text{H}_2\text{O}$), and pseudo and to a smaller

cobalt mineral. Nickel associated with cobalt is low: from 0.3 to 2.0 parts per 100.

The economic minerals are mostly amorphous mixtures impregnating the gangue which renders them difficult to concentrate. Their density is low and even extremely fine grinding does not separate them completely. From the viewpoint of cobalt alone, the ores

body was delimited and tested by drilling in 1939 and 1940. Surface stripping of overburden with electric shovels started in 1942; the first ore was shipped to the Kolwezi flotation plant in 1945. The open pit is now about 3,000 feet long, 1,500 feet wide, and 250 feet deep. It will be mined to a depth of 500 feet when the pit will be three times the present length. To date more than 20,-

COMES

COBALT

degree, oxides chrysocolla ($\text{CuS} \cdot \text{O}$) and pseudo malachite (phosphates). Gangue minerals comprise talc, limestone, dolomite, barite, silica, clay, and limonite. The Belgians ascribe a general formula to the cobalt minerals as follows: ($a \cdot \text{CoO} \cdot b \cdot \text{Co}_2\text{O}_3 \cdot c \cdot \text{CuO} \cdot d \cdot \text{H}_2\text{O}$); stating that the factors a, b, c, d may vary within wide limits, though the most important is the higher oxide of cobalt, Co_2O_3 . This affects later leaching process, cobaltic oxide being soluble in mineral acids only with the aid of a reducer. Iron, manganese, and aluminum are often part of the

are said to be more suitable for direct leaching than for concentration but, as most of them contain a high proportion of malachite which floats well, flotation is generally applied. Some ores, however, are suitable for selective mining without concentration, while others require only a washing treatment.

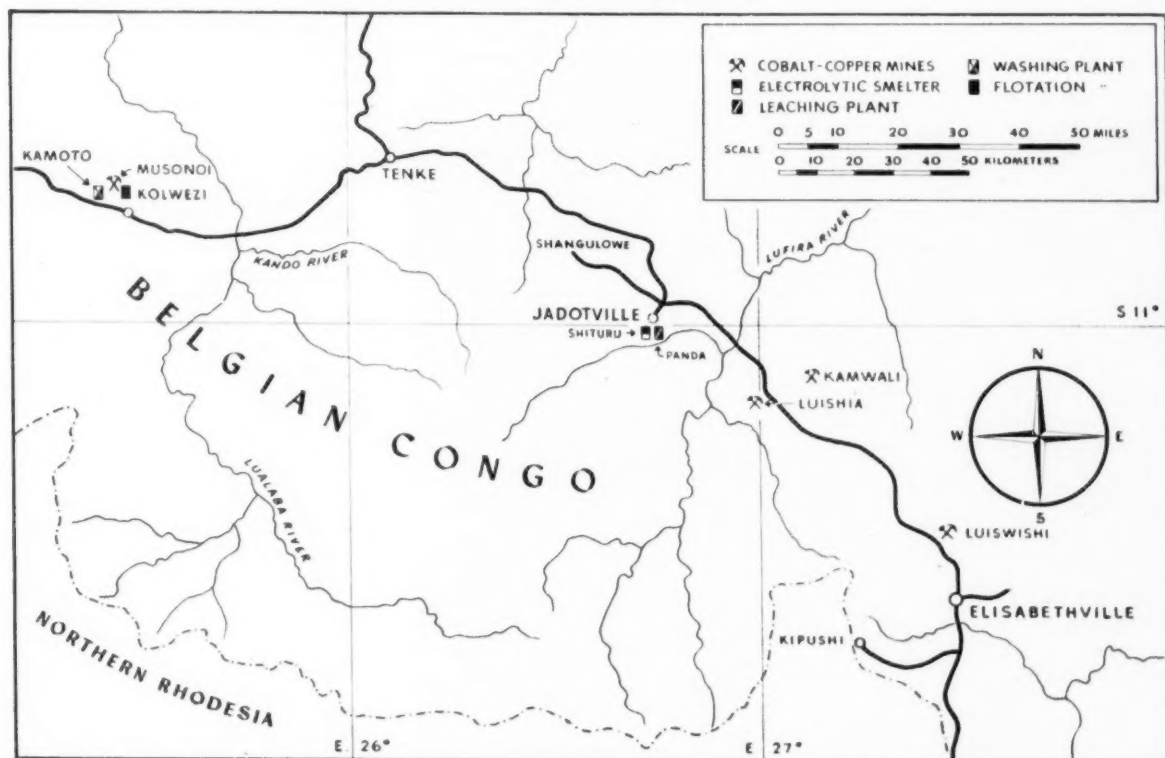
Open-Pit Mining

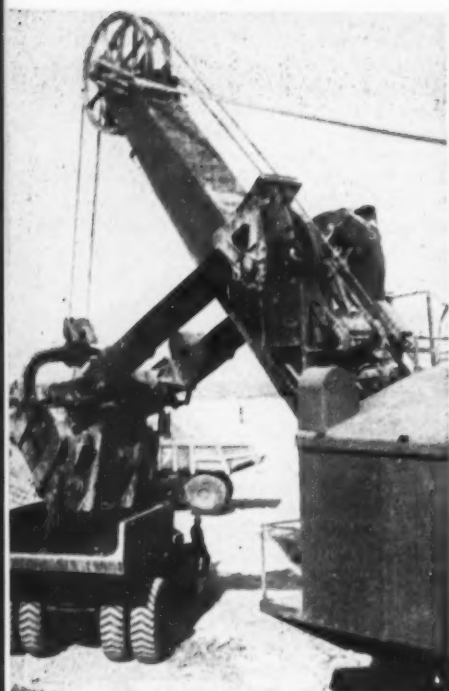
Musonoi is the principal mine whose ores carry cobalt (with copper). It is a relatively recently developed open-pit mine. The ore

000,000 tons of overburden and ore have been mined. Overburden-to-ore ratio is about 1.5 to 1.0. Sulfide ore has been found in depth, but it will be some time before it is mined. In 1952 stripping was carried out preliminary to enlarging and deepening the pit.

The large veins which stand out as dark colored bands in the sides of the pit are rich in cobalt minerals and are mined selectively. Up to 15,000 metric tons of these ores are mined and treated at the Kamoto washing plant each month. The highest grade cobalt ore is shipped

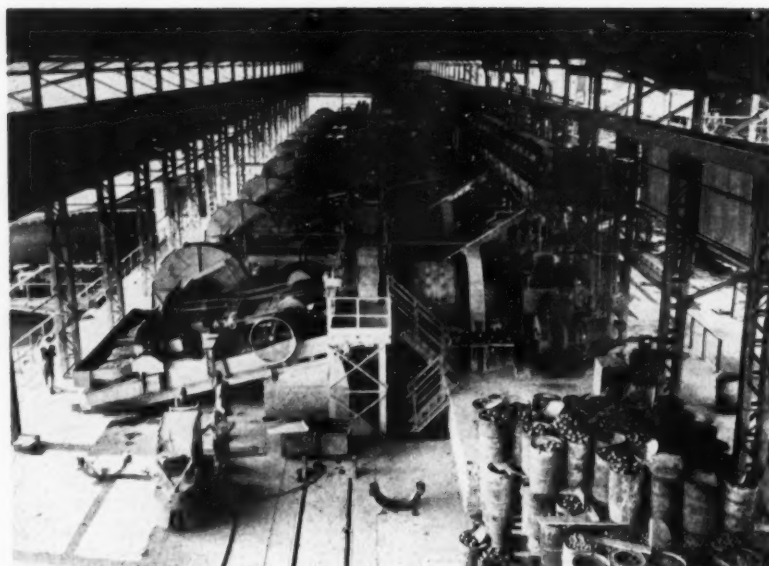
Cobalt mines and plants in the Belgian Congo.





Loading ore in the Musoni mine. This 6½-yard, 2200-volt electric shovel is one of largest operated by Union Minière. Diesel trucks haul ore to the primary crushing plant on pit's rim.

by railroad directly to the electrolytic smelter at Jadotville. About 150,000 metric tons of cobalt-copper ore and 1,000,000 of copper-cobalt



Musoni copper-cobalt ore is ground and classified in this section of the Kolwezi concentrator. *Deco Trefail*
Ten 8-foot by 48-inch Hardinge ball mills and 20 8- by 23-foot Dorr rake classifiers grind and classify the ore to 90 percent minus-65-mesh.

ore have been mined each year at Musoni and treated at the Kolwezi flotation plant. Mining is being expanded to supply the enlarged mill.

The oxidized ores are, in general, soft, but electric powered churn drills are used for blast hole drilling of the harder sections. Electric

shovels, Bucyrus-Erie, up to 6½-cubic-yard dipper capacity load the broken ore into 20-ton, Euclid, Diesel-powered, end dump trucks which haul out of the pit. Natives operate and repair the shovels and trucks under European supervision. The general opinion seems to be that the natives are excellent on routine operations, but helpless in emergencies.

Part of the Musoni mine, Kolwezi, Belgian Congo. This is the Union Minière's premier cobalt producer and the largest cobalt mine in the world.



The Kolwezi Concentrator

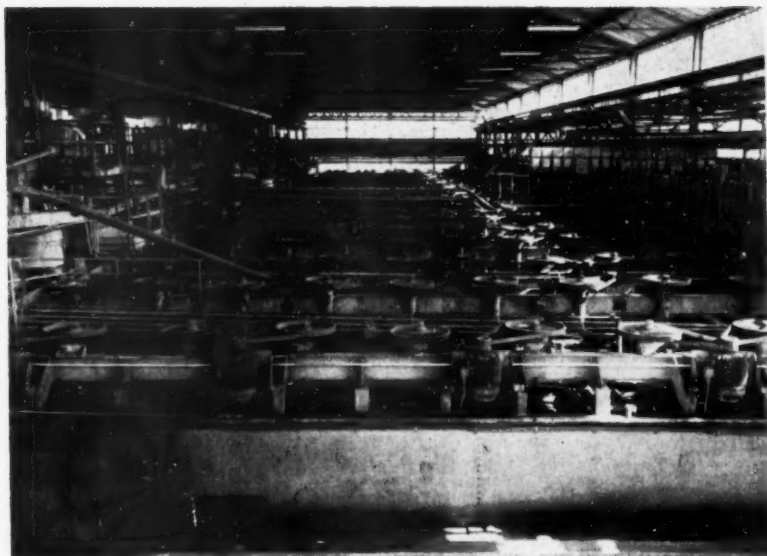
The most important unit for the concentration of cobalt-bearing ores is the Kolwezi concentrator, a well-equipped plant capable of handling 5,000 tons of ore daily. An additional unit, to be finished in April 1954, will increase this to 8,400 tons of ore per day. Two main classes of material are treated;

(a) Copper ores containing 6 to 8 percent copper, principally as malachite, and carrying about 0.35 percent cobalt.

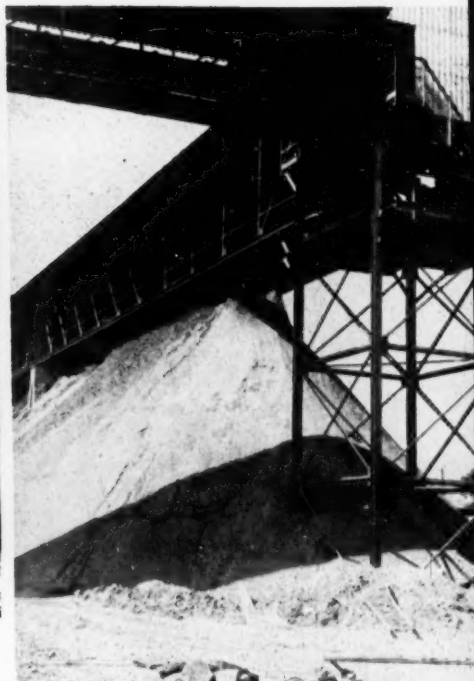
(b) So-called "cobalt" ores from selective mining, assaying 2 percent each of copper and cobalt.

In addition to (b) above, localized deposits containing 7 to 8 percent cobalt are encountered and also mined selectively. Because they already contain as much cobalt as concentrate derived from (b), no further beneficiation is necessary.

The Kolwezi concentrator operates in separate "copper" and "cobalt" campaigns, in proportion to the tonnages of ores (a) and (b) available. Concentrates from a month's



Copper-cobalt concentrate is made by 21 10 cell No. 24 Denver "Sub A" rougher machines; and 21 6 cell No. 24 "Sub A" machines for cleaning and recleaning at the Kolwezi concentrator.



Flotation concentrates from the Kolwezi concentrator are stockpiled by this belt conveyor system. Copper concentrate (with some cobalt) and cobalt-copper concentrate are stockpiled separately.

copper campaign amount to 24,000 tons assaying about 28 percent copper and 1 percent cobalt with tailing between 1.3 and 1.7 percent copper and 0.15 percent cobalt. Recoveries of copper and cobalt are 80 to 85 percent and 65 to 70 percent, respectively.

From a month's cobalt campaign, 3,500 tons of concentrate are produced carrying about 12 percent copper and 7 to 9 percent cobalt. Tailing carries 0.4 percent copper and 0.6 to 0.8 percent cobalt and will probably be treated for cobalt in a future leaching plant.

In 1952 the concentrator treated 1,602,676 metric tons of ore and recovered 287,997 metric tons of copper concentrate assaying 27.48 percent copper and 1.01 percent cobalt. Yield of cobalt concentrate was 43,071 metric tons assaying 8.62 percent cobalt.

Flow Sheet Details

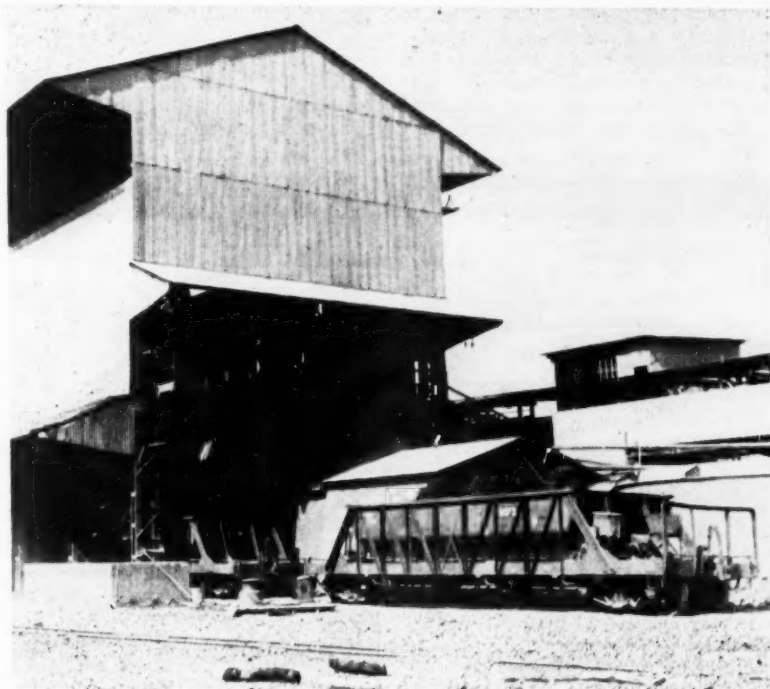
The concentrator flow sheet is generally as follows. Run-of-mine ore is delivered to an underground storage bin from which it is fed to 1.5 by 1.2 meter jaw crusher (Arbed Dommeldance, Luxembourg) driven by a 180-h.p. motor. Crushed ore is screened on 2½-inch Hewitt-Robins Gyrex screens and oversize reduced in 13-inch Symons gyratory crushers. Minus-2½-inch, plus-¾ inch pieces are crushed in 5½-foot Symons cones, but in the rainy season, when ores are wet, hammer mills are substituted for the cone crushers. Minus-¾-inch ore is ground in Hardinge

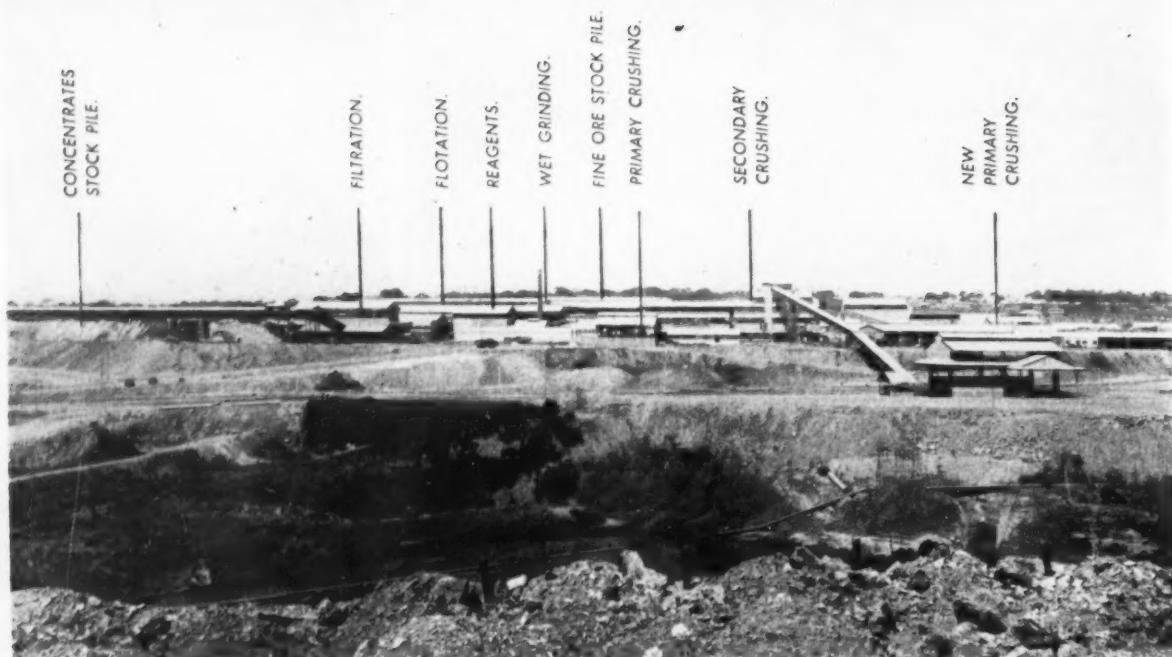
ball mills with 3½-inch-diameter ball and Dorr-classified to 90 percent minus-65-mesh before being pumped to conditioners.

Work is underway to enlarge the grinding section to increase concentrator capacity. Three rod mills are being installed ahead of the ball mills.

Ground ore is mechanically agitated with soda ash (1.5 pounds per ton) to bring pH to 9.0. If water is hard, the pulp may be steam-heated

Malachite concentrate with some cobalt is shipped by rail from the Kolwezi concentrator.





Panoramic view of the 5,000-ton-per-day Kolwezi concentrator. The flotation plant treats, separately, a copper ore assaying 6.0 to 8.0 percent copper and 0.35 percent cobalt, and a cobalt ore assaying 2.0 percent each of cobalt and copper.

to 33° C. Sodium silicate (0.5 pounds per ton) is also added to ensure good dispersion of gangue, the total time of agitation being about 45 minutes.

Flotation Requires Control

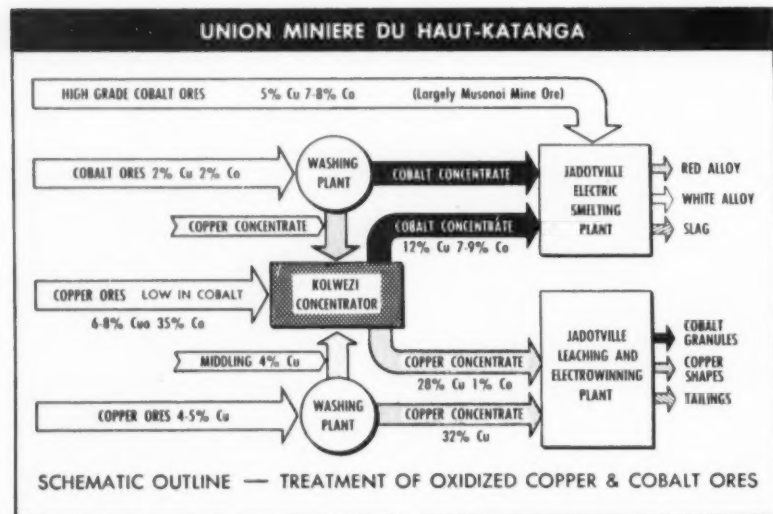
The actual collecting reagent is hydrolyzed palm oil (stearic, palmitic, and oleic acids). Since this is insoluble, it is dispersed in a high-speed grinder called a colloid mill and fluidized with 30 percent of raw palm oil which prevents the free acids (freezing temperature 35°

C.) from separating in the pulp. Total palm oil consumption is 3 to 5 pounds per ton.

Initial treatment is in a rougher unit consisting of 21 10-cell Denver Sub-A machines, the first three cells of each yielding finished concentrate. Product from the remaining seven cells is refloats in 6-cell units wherein cell Nos. 1 to 4 produce a concentrate for finishing in No. 5 and 6 cells. Tailing from the cleaners return to the roughers. Thickened concentrate is filtered on

Oliver filters to produce a cake with 15 to 16 percent moisture.

The approximate order of floatability of the minerals is as follows: barites, malachite and talc, limestone and dolomite, cobalt oxide, silica, clay, and limonite. With sufficient palm oil, all minerals will float so careful plant control is essential. Ores from certain locations are rich in dolomitic and talc minerals and are stockpiled pending perfection of special concentrating methods.¹



Leaching and Refining

A forthcoming article on cobalt will describe the Shituru plant of Union Minière where low-cobalt concentrates are leached, and copper is separated and recovered by electrolysis. The cobalt is recovered by electrolysis also and cast as granules. The Panda smelting works, where high-cobalt materials are electric-smelted to form cobalt alloys, will be described also.

¹ Sulphidizing with sodium hydrosulphide, as practiced at N'Changa Consolidated Copper Mines, Ltd., Northern Rhodesia, will probably be applied. —Ed.

References used for the series of cobalt articles include: Union Minière du Haut-Katanga, company monograph, 1950; Centenaire de l'Association des Ingénieurs Sortis de l'Ecole de Liège (A. I. Lg.), Congrès 1947, Section Coloniale; Cobalt, A. C. S. Monograph No. 108, Roland S. Young; Le Cobalt, Metallurgie par Voie Humide, Union Minière publication; Rhokana Review, Rhokana Corporation Limited; World's Non-Ferrous Smelters and Refineries, 1950; Deco Trefoil, November-December, 1952.

THE WENDEN PURCHASE DEPOT

has increased known reserves of much-needed manganese ore through the functioning of the government's General Services Administration program



The Government Manganese Purchase Depot at Wenden, Arizona is one of four similar depots that have been established by the General Services Administration in an attempt to increase domestic reserves and production of metallurgical-grade manganese. Offices, sampling laboratories, and the scales that weigh incoming rail and truck shipments to the depot are on the left. The main crushing and sampling plant in the center recovers samples averaging 65 pounds per 50 ton ore shipment. After sampling, the ore is stockpiled separately according to source. One of the largest of these stockpiles can be seen in the foreground.

Existing world economy depends, to a surprising extent, on the availability of high-grade manganese ores. Sixteen pounds of manganese are required for every ton of steel now produced. And steel can be considered the basis for what is commonly referred to as modern civilization. Steel production and living standards have long been closely parallel with the important exception of periods of international armed strife when steel production soars and world living standards retain status quo at best.

In Manganese, A Have-Not

The United States has never supplied its own needs for manganese since the time these needs arose in 1856 when Mushet discovered the metal's value in steelmaking. The vast deposits in Russia were the source of 50 percent of world supply in pre-war years and furnished the bulk of United States requirements. During World War II, production was cut sharply by the industrial chaos resulting from the German invasion of Russia. By the time large-scale production was resumed in the post-war years, politi-

cal conflicts between the spheres of influence represented by Russia and the United States removed Russian manganese indefinitely from our domestic markets.

During the war, the search for new sources of manganese to supply the needs for our expanding steel production was directed along two lines: discovery and development of high-grade foreign orebodies and expansion of those already in production; and the exploitation of the known low-grade deposits in the United States. The first of these at-

tempts proved to be the most successful on a total tonnage basis but the developed deposits suffered from the vulnerability inherent in wartime ocean shipments. On a percentage basis, however, domestic production had a wide lead in expansion, increasing nearly tenfold between 1938 and 1944.

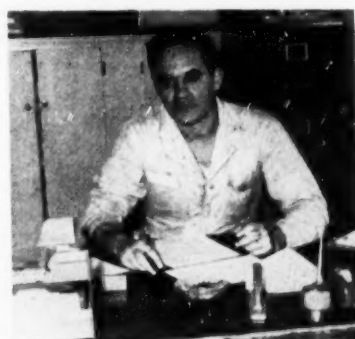
Wartime Developments

Most of the domestic production came from governmentally financed mines and plants that could not suc-

A. Earl Johnson is in charge of operations at the Wenden manganese purchase depot.



Glen Hanson handles the final samples taken from purchased ore.





When trucks from one shipper must be delayed awaiting completion of ore sampling for another shipper or mine, the ore is dumped on the ramps leading to the receiving bins and a carryall later moves it to the grizzlies.



ABOVE: The primary crushing unit is an 18 by 24 inch Universal jaw crusher that receives oversize from a 2-inch grizzly. The dust problem arising from this and other equipment in the plant has been corrected by the installation of dust collectors. BELOW: The first two of the three in-line samplers with which the plant is equipped are shown here—46-inch and 42-inch Snyder units. Ore passing from the first to the second is crushed in a 10 by 16 inch Universal jaw.



cessfully compete with foreign ores on a peacetime market. After the war, when the first flush of hope for world peace was replaced by a sober realization that the world was deeply divided into two camps of divergent ideologies seemingly irrecon-

Table No. I
Price Schedule for Lots Totalling Less Than 50 Tons During 30-Day Period

Percent Mn in ore	To be paid for 1.0 long dry ton
15	\$ 8.54
16	10.24
17	12.00
18	13.71
19	15.48
20	17.20
21	19.13
22	21.06
23	23.03
24	24.99
25	26.94
26	29.64
27	32.40
28	35.11
29	37.88
30	40.60
31	44.73
32	46.86
33	50.00
34	53.14
35	56.29
36	60.74
37	65.15
38	69.61
39	74.03
40 (fines)	78.00
40 (ore)	88.00

cilable, government agencies were set up to study the problems surrounding the supply of strategic and essential raw materials, among them manganese. When the Korean conflict began, manganese stockpiles were up but domestic production was in much the same position that it was before World War II. During a national emergency involving ac-

Table No. II
Minimum Grade Requirements

The depot will reject any ore assaying less than 15 percent manganese or any single shipment weighing less than 5.0 long tons.
The depot will reject any lot aggregating more than 50 tons during a 30-day period which, on the basis of laboratory testing, cannot be beneficiated to a product the chemical analysis of which falls within the following limits in all respects:

Manganese	40.0% minimum
Iron	16.0% maximum
Silica plus Alumina	15.0% maximum
Phosphorus	.30% maximum
Copper plus Lead plus Zinc	1.00% maximum*

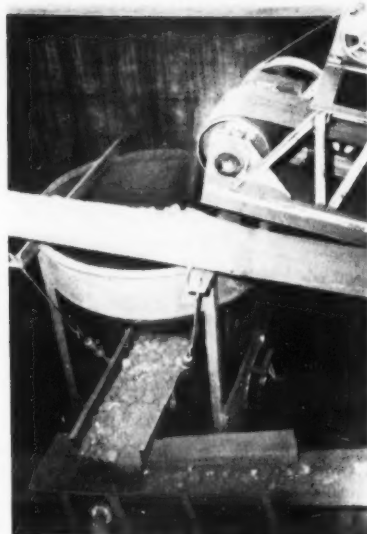
* Of which not more than 0.25 percent may be copper.

tive or incipient widespread armed conflict, expanding industrial needs and curtailed shipments from foreign suppliers are two factors that rapidly attenuate existing stockpiles.

Present Purchase Program

To prevent repetition of the conditions during the war without ac-

MINING WORLD



A one-ton surge bin between two of the samplers prevents over- or under-loading the circuit.

tive participation as a mineral producer, the government instituted a mineral purchase program, which included manganese, under the direction of the General Services Administration. It consists of a combination of guaranteed price and tonnage schedules. Depots for the purchase of manganese ores were established at Deming, New Mexico; Wenden, Arizona; Butte and Phillipsburg, Montana. Authorized purchases are set at a total of 18,000,000 long ton units of manganese contained in domestic ores assaying not less than 15.0 percent manganese. Of these purchases, 6,000,000 units were allotted to Deming and Wenden, and a like amount to the combined Butte and Phillipsburg depots. Originally, the program was to be terminated June 30, 1956 or upon the purchase of the total authorized allotments, which ever occurred first. A bill has now passed congress, however, extending the purchase

Table No. III
Price Schedule for Lots Totalling
More Than 50 Tons During
30-Day Period

Specifications	Percent
Manganese	48.0
Iron	6.0
Silica plus Alumina	11.0
Phosphorus	0.12
<i>Price</i>	
To be paid on the basis of \$2.30 per long ton of recoverable manganese, subject to a charge of \$10.00 per long ton of ore to cover the cost of sampling, milling, and handling. All shipments are subject to the premiums and penalties set forth below.	
<i>Premiums</i>	
Manganese	above 48.0% : 1½¢/1.0%
Iron	below 6.0% : 1¢/1.0%
<i>Penalties</i>	
Manganese	48.0 to 44.0% : 1¢/1.0%
	44.0 to 40.0% : 4¢ plus 1½¢/1.0%
Iron	6.0 to 8.0% : 1¢/1.0%
	8.0 to 16.0% : 2¢ plus ¼¢/1.0%
Silica plus Alumina	11.0 to 15.0% : 1¢/1.0%
Phosphorus ..	0.12 to 0.30% : 1/3¢/0.01%
Lead and Zinc ..	Ores high in lead and zinc will be subject to a charge of \$2.25 per long ton to cover the cost of nodulizing to meet minimum grade

program to June 30, 1958, though no increase in the allotments is included. Applications for the right to participate in the program, originally subject to a deadline of August 31, 1953, may now be submitted up to and including June 30, 1954.

The four areas in which the depots were established were known to contain manganese deposits workable on a relatively small scale but potentially important in aggregate production and possibly competitive with foreign ores if once developed.

Increases Reserves

Of the four depots, Wenden has been the most successful. Shipments through July 28, 1953 totalled 904,000 long ton manganese units. Steadily increasing shipments to this depot, and behind-schedule receipts



Crushed and sampled ore is trucked to stockpiles that are segregated according to the source of the ore.

at the other three stations, indicate that the legal limit of purchases at Wenden may be increased at the expense of the other depots. A. Earl Johnson directs operations at Wenden and Glen M. Hanson of the U. S. Bureau of Mines is in charge of samples handling.

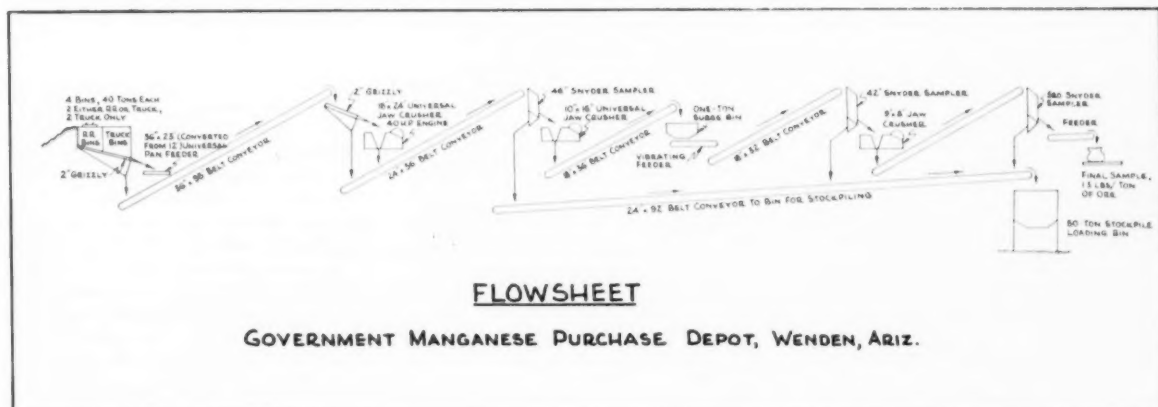
Wenden Depot Sampler

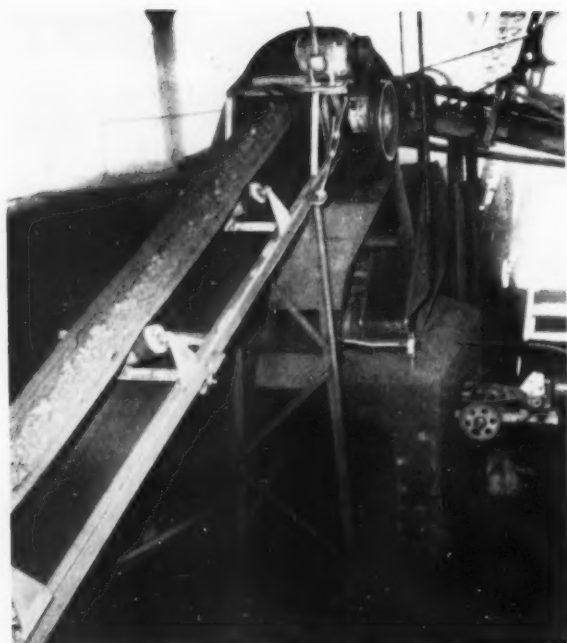
The Wenden depot consists of receiving bins for both rail and truck

Table No. IV
Record of Wenden Ore Purchases By
Grades and Tonnages¹

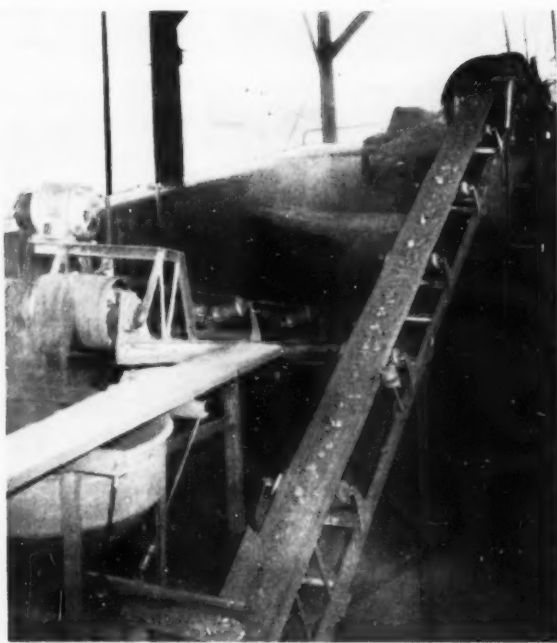
<i>Percent Manganese</i>	<i>Long Dry Tons Through August 31</i>	<i>Manganese, Units Through August 31</i>
15 to 20	43,925.7	722,401
20 to 25	11,136.9	249,024
25 to 30	2,702.4	72,967
30 to 35	2,207.8	71,757
35 to 40	1,418.6	51,936
Over 40	1,191.5	53,018
Totals	62,682.9	1,221,103

1. Weighted average of all purchases is 19.4 per cent Mn.





The conveyor in the background carries the crushed and sampled ore to the temporary storage bin where it is loaded and trucked to the various stockpiles at the depot.



The dust production in this section of the Wenden plant is now being controlled by a dust collection system. Sampling units are in the background, with transfer belts between them leading to and from the surge bin in the left foreground.

shipments, a three-stage crushing and sampling plant, and a storage area where ore from each property is stockpiled separately. Crushing and sampling facilities have a capacity of 400 tons per shift. Original schedules called for only one shift per day but with the successful development of ore reserves near Wenden as opposed to the much lower receipts at other depots, the plant is now run two shifts a day. Three-shift operation is a future possibility if quotas at the other stations are transferred to Wenden.

Samples recovered from the shipments to Wenden average about 1.3 pounds per ton of ore or 65 pounds from a 50-ton lot. The primary sample is divided into five parts before testing. Two of these are sent to U. S. Bureau of Mines laboratories for analysis and to determine the content of recoverable manganese and the grade to which the ore can be concentrated by jigging, tabling, and flotation. Two of the samples are retained at the depot for a permanent record and an umpire sample in the event of dispute. The fifth sample is sent to the shipper. For lots from individual shippers that total less than 50 tons during any 30-day period, the depot reserves the right to dispense with testing for anything other than manganese content and final payment is based on the price schedule in Table No. I.

Price Schedules

Any lot that tests show cannot be beneficiated economically to meet the minimum grade allowable (see Table No. II) is rejected. Payment for acceptable ore in lots greater than 50 tons during a 30-day period is made at the rate of \$2.30 per long ton unit of recoverable manganese, subject to the penalties and premiums listed in Table No. III and to

Table No. V

Partial List of Shippers to Wenden Manganese Purchase Depot

Shipper	Mine	Location
ARIZONA		
Al Stoval	Lake, Doyle, and Love	Artillery Peak
Black Nugget Mining Corporation	Black Nugget	Agua
Rosley and Stoval	Hayden*	Flagstaff
A. R. Buehl	Black Rock	Agua
L. W. Curry	Black Rock No. 2	Wickenburg
D. R. Harryman	Manganese King	Parker
L. C. Hitchmacker	National Debt No. 4	Wenden
Miller and Christoffer-son	Black Raven	Agua
Les Neilson	Black Crow	Artillery Peak
Paul Pellegrini	Mistake	Wickenburg
J. F. Power	Power No. 1 and 2	Cibola
P. A. Sifton	Kaneb No. 4	Artillery Peak
W. R. Tenney	Cindy No. 1 and 2	Yuma County
CALIFORNIA		
I. Mills Bean	Pioneer	Rhythe
Joe T. Brock	Manganese King	Cross Roads
Alfred Figueroa	Arlington	Rhythe
Danny Figueroa	Black Jack, Manganese Canyon and Glory Hole	Arlington*
A. R. Miner		Rhythe
Sweet and Brown		Riverside County
Williams and Cornwall	Lugo*, Tadpole*	Rhythe
NEVADA		
Combined Metals Reduction Company	Southpaw Group	Hiko
Sam M. Robinson	Columbia	Ruth

* Jig concentrate.

a charge of \$10.00 per ton for sampling, handling, and milling. Due to the time involved in testing, preliminary payments are made on the basis of the schedule in Table No. I and later adjusted up or down on the basis of test results.

Through July, 370 certificates of authorization to sell ore to the Wenden depot were issued. Of these, 109 shippers have so far been active. Table No. V is a partial list of the more active suppliers. Some of these are developing reserves that warrant the construction of privately owned beneficiating plants. As an example, the Black Queen and the Arlington are presently upgrading ore by jigging.

Widespread Suppliers

Most of the ore received at Wenden originates within a 65-mile radius of the depot. As Table No. V shows, however, operators from more distant points have been active.

A long-recognized problem of developing new mines to produce a mineral subject to markets that constantly fluctuate, is the uncertainty of recovering exploration and development investments. By guaranteeing for a definite period both a price and a market, the government has removed this risk and has been instrumental in increasing known reserves and present production.



ADVANCES IN MINE MECHANIZATION: Were reported by (left to right) L. M. Kinney, general mine superintendent, Pend Oreille Mines and Metals Company, Metaline Falls, Washington; S. S. Clarke, general superintendent of Tri-State mines, Eagle Picher Company, Cardin, Oklahoma; A. B. Chafetz, assistant superintendent maintenance and engineering, International Minerals and Chemical Corporation, Carlsbad, New Mexico; and John Petty, mine superintendent, Climax Molybdenum Company, Climax, Colorado.



ROCK BREAKING: Drew a large crowd of operators. At left is E. G. Easterly, special representative, Atlas Powder Company, Seattle, Washington, shown speaking on *Mining Methods and Techniques in Principal Metal Mines in State of Washington*. Following this session, informal discussions were held by (left center from left to right) Al Barocca, sales manager, Olin Industries, Inc., E. R. Borchardt, chief research engineer, Anaconda Copper Mining Company, and E. R. Sandvig, research engineer, Anaconda Copper Mining Company. In the (right center) picture Lester Bishop, Anaconda research engineer, is shown talking to F. W. Nelson, field engineer for the Coast Manufacturing and Supply Company. At the far right Robert Van Evera, industrial engineer, Calumet Division, Calumet and Hecla Inc., John J. Curzon, manager, Chelan Division, Howe Sound Company, are listening to Roger V. Pierce, Salt Lake City consulting mining engineer.

AMC — Seattle Convention Hears Of Need For U. S. Mineral Policy

A promise of a definite domestic minerals policy by the United States government has been given by the man who will have most to do in formulating that policy—Felix E. Wormser, assistant secretary for mineral resources, United States Department of the Interior. Secretary Wormser brought this promise to the leaders of the mining industry at the annual western division meeting of the American Mining Congress during its convention in Seattle, Washington from September 21 through the 24th.

Such a policy, he said, should include the following premises: "A minerals policy must contribute to a strong and vigorous domestic mining industry by intensifying exploration, discovery, and full utilization

of our full resources. This policy must serve to promote the national interest and must be consistent with an enlightened foreign economic policy, at the same time taking into account the legitimate needs of domestic producers as we move forward in our efforts to lift the scores of barriers to liberalized trade now prevailing throughout the world. Such a policy must look toward greater freedom of the market place, less intervention, support, or control by government; in other words, a maximum of free enterprise."

Since such a policy may take months to formulate and become effective, the operators were naturally concerned with their immediate problems. Faced by mounting

costs and declining prices and markets, they thronged to the operating sessions to profit from experiences of other operators. Highlights of these sessions and discussions follow.

Advances In Mechanization

L. M. Kinney, general mine superintendent, Pend Oreille Mines and Metals Company, Metaline Falls, Washington, told how trackless mining methods are now being used at the Pend Oreille mine. First, a horizontal slice, 14 to 16 feet high and the width of the orebody, is taken. When this slice is completed, mining is then done by using continuous 20-foot-high benches. Drilling is done with Diesel- and air-powered, track-mounted jum-



DISTINGUISHED VISITOR: Was the Honorable B. Frank Heintzleman (left), governor of Alaska, who spoke on *Alaska and Its Development*. At right are some of those who attended the open house held by the School of Mineral Engineering, University of Washington, Seattle, Washington. Standing from left to right are: Thomas Miller, assistant director, U. S. Bureau of Mines, Washington, D. C.; H. F. Yancey, supervisor, Northwest U. S. Bureau of Mines Experiment Station; Edward H. Robie, secretary AIME, New York, New York; and Drury A. Pifer, director, School of Mineral Engineering, University of Washington. Seated from left to right are: Milnor Roberts, former dean of the School of Mineral Engineering, University of Washington; and Lewis E. Young, consulting engineer, Pittsburgh, Pennsylvania.

bos using detachable tungsten carbide bits. One Eimco 104 rocker-type loader and five Allis-Chalmers HD-5-G front-end loaders are used to load the broken ore into seven 6.3-cubic-yard Dart trucks. At the present time 65 percent of the ore is being mined using trackless methods and employing 40 percent of the men. The remaining 35 percent of the ore is mined using track methods and employing 60 percent of the men. The use of trackless mining equipment underground at the Pend Oreille mine has increased the tons per man shift and decreased costs per ton to make the operation profitable instead of unprofitable under the present low metal price.

Developments in equipment, methods, and controls for increased production was the subject on which John Petty, mine superintendent, Climax Molybdenum Company, Climax, Colorado, spoke. Mr. Petty gave a summary of how Climax's efficient slusher system works and how improvements in haulage have been made by using trolley radios and improved electric locomotives. Climax is now completing a large expansion program, and production of 28,000 tons per day is foreseen by the end of this year.

A summary of the recent developments in potash mining was presented by A. B. Chafetz, assistant superintendent of maintenance and engineering, International Minerals and Chemical Corporation, Carlsbad, New Mexico. Postwar demands of the fertilizer and chemical trades have called for new and improved types of equipment in mining. Some

of these are the introduction of continuous miners, jumbo drills, Diesel electric locomotives, and Diesel shuttlecars. Portable mine power centers have been introduced underground for greater flexibility of power.

Rock Breaking

Recent drilling trends at the Calumet and Hecla Inc. copper mines in northern Michigan have made a substantial reduction in drilling costs as shown by Robert W. Van Evera, industrial engineer. For the past seven years Calumet and Hecla Inc. has been intensively testing drilling machines, drill steel, and bits. The results of these tests showed that by using an air-leg drill in preference to the previously used post-mounted 3- and 3½-inch drifter, an increase of 45 percent of hole per miner-shift was obtained. The tons per miner-shift were doubled. The increased penetration rate is a result of drilling a smaller hole with tungsten carbide bits. The footage increase is a result of more actual drilling time per shift. The tonnage increase is a result of this additional footage plus the ability to drill more evenly burdened holes with the air-leg drill. Records on maintenance costs indicate no appreciable change will result from switching to air-leg equipment. In testing drill steel, it has been found that alloy steel out-performs carbon steel.

R. L. Sandvig, research engineer, Anaconda Copper Mining Company, Butte, Montana, described the advantages of push feed drills. The

principal advantages as outlined by him are:

- (1) They reduce miner fatigue, enabling the miner to do more work.
- (2) They are all-purpose drills.
- (3) Less over-all drilling time is needed for a required footage of hole. This is because of the use of long steel changes or no steel changes at all.
- (4) Less drill steel is required.
- (5) No auxiliary equipment is needed.

Open Pit Mining

A panel discussion on the trend toward larger shovels in mining was presented by L. F. Pett, general manager, Utah Copper Division, Kennecott Copper Corporation, Salt Lake City, Utah. Those who took part in the discussion were: R. M. Dickey, sales manager, Large Machine and Dredge Sales, Bucyrus-Eire Company; A. F. Busick, Jr., vice president—engineering, Marion Power Shovel Company; and Paul Hunt, Large Excavator Division, Harnischfeger Corporation.

Some of the factors which appear to be influencing the trend toward larger shovels are: (1) Depletion of high-grade ore reserves, thus requiring considerably greater tonnages to be mined. (2) The steadily mounting labor scale. Besides a man's actual wages, additional benefits now add immensely to the cost of maintaining a man on the payroll. (3) In the past the size of a shovel used on a given job was limited by the size of the truck or rail car available for haulage. With the development and perfection of larger trucks and rail cars, the economics of a combination of larger shovels and haulage units becomes possible.

Output estimates indicate that the 8-cubic-yard shovel has an output potential of 30 percent more than the 6-cubic-yard machine for equivalent work, and the 10-cubic-

CONVENTION CHAIRMAN Robert M. Hardy, president, Sunshine Mining Company, Yakima, Washington.



MINING WORLD

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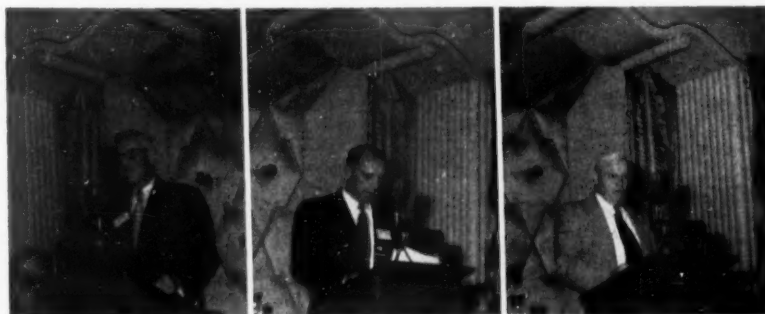
yard machine has a 23 percent greater output than the 8 cubic yard. When these estimated outputs are related to over-all operating cost, it is found that the 8-cubic-yard shovel operates at a cost per yard of 93 percent of that of the 6-cubic-yard and the 10 cubic yard at 90 percent of that of the 8 cubic yard.

This emphasizes that items extraneous to the excavators proper must be given full weight in shovel selection. Some of these items to be taken into consideration are: (1) Actual deposit to be mined with pit layout. (2) Size of haulage equipment. Correlation of dipper sizes and haulage units is of fundamental importance. The impact of material dropping from the larger dippers into the haulage equipment may greatly increase the maintenance of haulage equipment. (3) Mobility and flexibility of smaller shovels. (4) Labor supply. Where suitable labor is difficult to obtain, it becomes desirable to reduce the number of machinery units to a minimum.

In spite of apparent limitations, some manufacturers of shovel and haulage equipment are recognizing the trend to larger shovels and have built, or are developing, larger units in answer to this trend. The success of these undertakings is due to several important engineering advances. In the case of shovel manufacture, the engineering development of simplified, lower cost, better performing electrical controls to handle the larger power requirements of the increased size of machine is of major importance. The development and application of new mechanical and electro-mechanical power transferring devices has made possible the smooth application of large amounts of power in order to create faster digging and



NATIONAL POLICIES FOR MINERALS: Were outlined by Arthur S. Fleming (left) director, Office of Defense Mobilization, Washington, D. C.; Felix E. Wormser (center), assistant secretary for minerals, Department of the Interior, Washington, D. C.; and Kenneth C. Kellar (right), Homestake Mining Company, Lead, South Dakota. Mr. Kellar was presiding chairman at this the convention's opening session on Monday September 21.



NEW MINING DEVELOPMENTS: Chairman Roy A. Hardy (left), consulting engineer, Getchell Mine, Inc., Red House, Nevada, opens the session. E. S. Mollard (center), manager, Hanna Nickel Smelting Company, Riddle, Oregon, reads R. W. Whitney's paper on *Advances in Iron Ore Mining*. Whitney is general manager of Minnesota mines for M. A. Hanna Company. *Steel Rail Sets at Resurrection Mining Company* was the title of William R. Doyle who was Resurrection master mechanic when steel sets were introduced. He is now employed by Newmont Exploration, Ltd. with headquarters in Montrose, Colorado.

swinging cycles with larger, heavier machines. Also the increased use of alloy steel and welded construction has permitted the building of larger machines with lower ratio of weight to dipper size than heretofore. In haulage equipment, the successful development and application of torque converters and higher horsepower engines has made possible the design of large size units with actually lower operating costs than the conventionally powered, smaller capacity units.

Developments in Prospecting

Dr. R. E. Delavault, Department of Geology, University of British Columbia, Vancouver, explained the use and procedure of water testing in geochemical prospecting. Dr. Delavault's research has shown that creeks which are too small to float a canoe will exhibit metal contents if they cross mineralization of some importance. Just by exhaustive testing along his way, a water-borne prospector has the greatest probability for being led toward any large

DEVELOPMENTS IN PROSPECTING: Featured both United States and Canadian speakers. From left to right they are: Philip Shenon, session chairman and director, Day Mines, Inc., Wallace, Idaho; Robert E. Sorenson, vice president, Hecla Mining Company, Wallace, Idaho; Dr. R. E. Delavault, research associate, Department of Geology and Geography, University of British Columbia, Vancouver, British Columbia; and R. N. Moxham, geologist, United States Geological Survey, Washington, D. C.



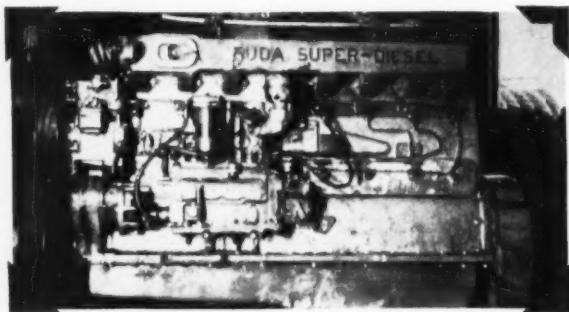
THE ENGINEER'S REPORT

	DATA
LUBRICANT	RPM DeLo Oils
UNITS	21 Buda diesel engines
OPERATION	Hauling ore
CONDITIONS	Heavy duty — 8-15% grades
PERIOD	6 years
FIRM	Bagdad Copper Corp., Bagdad, Arizona

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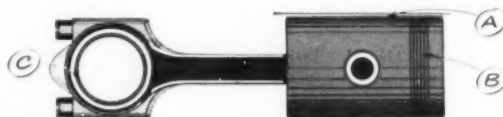


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mineralization within reach. This gives to water testing a great practical importance in regions where only widely spaced geological exploration has ever been conducted, along the few acceptable trails, and where more detailed reconnaissance work would meet nearly insuperable difficulties and present a prohibitive cost for any large area.

The test itself is simple and requires only five to ten minutes to complete. All there is to do is to fill a beaker with the water; add, in succession, three reagents, one only being measured accurately by counting drops; and waiting one or two minutes for the color developed in the reaction to be collected by droplets of xylene, which separate like oil at the upper surface of the water. Zinc, copper, and many other metals, especially cobalt and nickel, can give the same reaction, but zinc remains the best pathfinder to mineralization, even if present only in very small proportions.

In practice, when a metal-bearing creek is found, the prospector should work his way upstream testing every tributary and frequently retesting the main creek in order to localize the origin of any metal present in the water. Eventually, these tributaries should be explored too. Finally, the origin is reached; it well may be buried under sediment, and further work, through trenching or plant sampling, is necessary for a more accurate localization.

One of the new methods in ore search is the use of large-scale vertical stereoscopic color air photography. Philip A. Laylander, geologist, Aerogeological Exploration, Fallon, Nevada, described the importance of this new prospecting method. A study of dozens of large and small mining districts, including



SALMON DERBY WINNERS: On Tuesday morning—Mrs. C. O. Dale (left) with her second-place 3-pound 9-ounce catch. She is the wife of the manager of Eagle-Picher Company's Illinois and Wisconsin mines. Part of the fishing crowd are shown eating breakfast in the center picture. The winning salmon weighed in at 4-pounds 6-ounces and was caught by Arch Sproul (right), engineer for the Stearns Roger Manufacturing Company, Denver, Colorado.

most of the important ones in the western United States, has been made by Mr. Laylander during the past six years. The results of this study have shown that there is an important class of information provided only by the color air photographs.

Much information concerning the types and grades of hydrothermal alteration aureoles is seen only with considerable difficulty by painstaking ground study. The color photographs allow rapid observation of large areas at one time with best lighting and perspective. A characteristic of the color photographs is a much greater sensitivity to certain slight, but important, changes in color and tone of the altered rocks which is necessary in perceiving zonal relationships and predicting ore loci.

Photogeologic studies of areas of from 20 to 100 square miles or more will be used for selecting specific target areas of one square mile or less where more detailed geology can then be carried out. (See *MINING WORLD*, June 1951, pp. 41-43.)

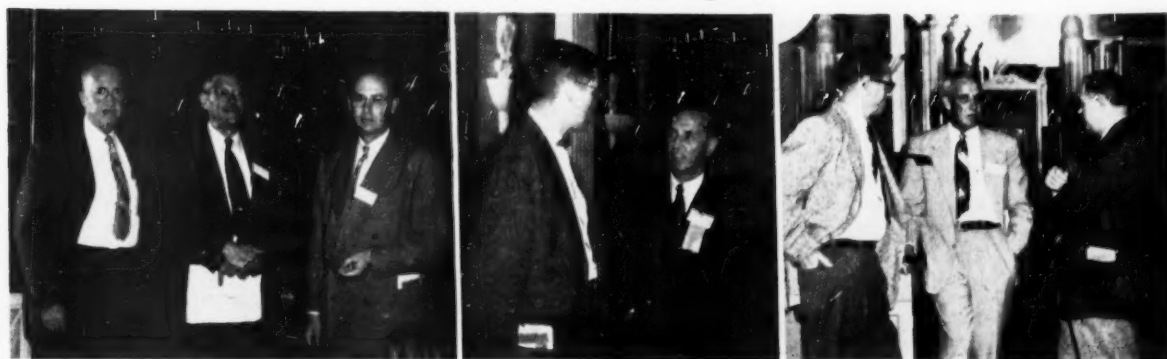
Salmon Derby

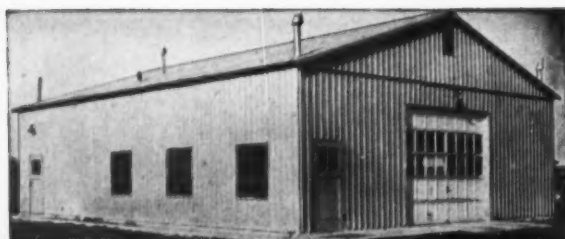
For those "dyed in the wool" fishermen, a salmon derby was held on Tuesday and Wednesday mornings. Transportation to the dock on Puget Sound and complete fishing gear were provided. The derby began at 5:00 A.M. and ended at 8:00 A.M. followed by a real fisherman's breakfast. Prizes for the first, second, and third largest salmon caught each morning were presented to the winners. On Tuesday morning, Arch Sproul, Stearns-Roger Manufacturing Company, Denver, Colorado won first prize with a 4-pound 8-ounce salmon. Second prize went to Mrs. C. O. Dale, wife of the manager, Eagle Picher Company, Illinois-Wisconsin mines for a 3-pound 9-ounce salmon.

San Francisco Next Year

The convention delegates chose San Francisco, California as the location of the next year's meeting, and elected Donald H. McLaughlin, president of the Homestake Mining Company, as the general chairman.

IRON MINING DEVELOPMENTS: Are discussed by these three groups. At left are W. F. Ferris, president, Meriden Iron Company; Russell H. Bennett, chairman, Meriden Iron Company; and G. R. Powe, chief mine geologist, Northern Pacific Railway Company. In the center are Fayette Brown, Jr., assistant vice president, Cleveland-Cliffs Iron Company; and Walter A. Sterling, president of Cleveland-Cliffs. In the picture at right W. F. Briney, sales engineer, Modern Machinery Company; L. M. Case, manager, mining and rock drill sales, Le Roi Company; and R. A. Meyer, Le Roi development engineer.





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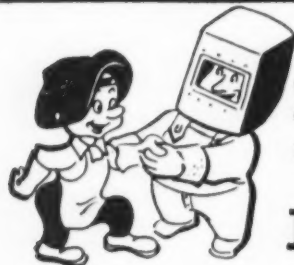
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The industrial development of the United States in the last few decades has been one of the highlights of history. The economists have made many analyses to ascertain the reason for this great development. In every one there has been agreement that a sound mining industry has been one of the foundation planks. In spite of these findings, during the last 20 years there has been a seemingly concerted effort by certain Bureaus in Washington to hamper the mining industry in every possible way. This was shown by the recommendations in the Paley Report.

During a rather long activity in mining we have worked on five national forests and forest reserves, and before they were formed there was promotion work during the fight of Theodore Roosevelt and Grover Pinchot on behalf of conservation. In all of those years we have had only friendship and cordial cooperation from all of the field force of the national forest service—even to the extent that for more than 10 years we carried a badge as forest guard, per diem. The field forces can only carry out orders from above. The mining industry troubles with the forest service originate in the executive offices in Washington—bureaucrats reaching out for more power.

One cause for the disputes with the forest service lies in the timber on the claims in the forests. Title 16, Sec. 604 of the mining law states that the miner shall have the free, necessary use of the timber on his claims, subject only to the regulations and rules made by the Secretary of Agriculture. These last have become so onerous as to almost cancel out all liberty to the use of timber. Rangers are not always in favor of the bureaucratic rulings. Thirty-six years ago we took over the operation of a property in Colorado. Soon after our arrival the ranger called to get acquainted with the newcomers. When he was told that one of the first pieces of work was a necessary timbered man way to one of the stopes, he said, "Do not cut any timber till I come in and mark your trees for you." He had done his duty as he saw it, but we did not see him again in the two years spent there. A nice, dead, 94-foot pine tree supplied timber for a good man way.

Several years ago the ranger in our present location made one of his family calls. As he was about to leave he wrote in a book and handed over a small yellow slip. When asked what that was, he said, "That is a grazing permit for your burro." We replied that the burro hardly needed a permit as it was not likely to graze outside the 140 acres of our seven claims. He merely smiled at our naiveté, but said, "These claims are a part of this allotment. The number of domesticated animals grazing here is strictly limited. No animal will be allowed to graze here without a permit."

Our next-door neighbor had three small children. To protect them from the grazing cattle, and to have a little garden for green vegetables he had fenced about an acre of ground at the house. The assistant supervisor of the forest rode in on an inspection trip. As soon as he saw the fence he yelled to my friend, "Tear this fence down." My friend quietly replied, "I will not tear this fence down. I know my rights." The official lost his control and cursed, "Damn you. This is an order. Tear this fence down. YOU HAVE NO RIGHTS HERE!" The fence was NOT torn down. That assistant supervisor is no longer with the forest service.

The Wanderer

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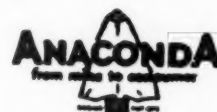
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If you'll take just three minutes to check these important points, you may discover a better, less expensive way to solve your own piping problems. It is to your advantage to keep informed regarding the latest improvements in piping materials.

WHAT NEW TYPE OF PIPE MAY HANDLE YOUR JOB BETTER?

If you are not getting maximum trouble-free life from the pipe you are presently using, or if you are using expensive materials like lead, brass or stainless steel, you should investigate plastic pipe—it may save you money, and it's highly possible that plastic will *outlive* and *outperform* your present piping! Here's a simple formula for selecting the right piping material for your job:

**COST OF PIPE + INSTALLATION COST + MAINTENANCE COSTS = VALUE
LONGEVITY (YEARS OF LIFE)**

WHY SHOULD I CONSIDER USING PLASTIC PIPE?

In the right application, plastic pipe can outperform any other pipe many times. You should consider the use of plastic pipe when: (1) corrosion (including electrolysis) is a problem; (2) plastic is less expensive than the piping materials presently being used; (3) you have scaling or wall caking; (4) ease of installing plastic pipe will result in worth-while savings; (5) light weight or flexibility is desired; (6) a higher flow factor is wanted (15-40% greater than steel).

CAN I STOP EXPENSIVE PIPE CORROSION?

Scaling and pipe corrosion from any cause such as corrosive line fluids, electrolysis, soil condition, atmospheric conditions, tuberculation, etc. can be minimized and often

stopped completely by using plastic pipe. If you haven't looked into plastic for corrosive applications, you may be wasting thousands of dollars each year in shortened pipe life!

CAN PLASTIC PIPES TAKE MY PRESSURES

AND TEMPERATURES? Unless you've evaluated your piping recently, and investigated the many new materials available, you may not be getting the maximum value from your present piping investment. Six basic types of plastic pipe now available provide a wide range of temperature and pressure applications. Working temperatures up to 230°F. and safe working pressures up to 300 psi are now possible with plastic pipe. Republic will help you determine the *one best* pipe for your particular job—whether it's plastic or metal.

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 - ☐ Fiberglass
 - ☐ Saran
- ☐ Please contact me regarding additional specific information on plastic piping.

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ACTIVITIES OF U. S. MINING MEN

Malcolm C. Brown, general manager of mining operations at the Sidney mine in the Coeur d'Alene region of northern Idaho for the last 10 years, has been appointed president of the Sidney Mining Company. He succeeds **W. T. Simons** who has retired.

George F. Reed, formerly of Kingman, Arizona, is now general superintendent of the Black Rock mine in Bishop, California. The firm, Black Rock Mining Corporation, operates a tungsten mine and mill.

John W. Vanderwilt, president of the Colorado School of Mines at Golden, Colorado, and **Evan Just**, vice president of the Cyprus Mines Corporation, have been named co-chairmen of the steering committee on domestic problems of non-fuel minerals for the Mid-Century Conference on Resources for the Future which will be held in Washington, D. C., December 2-4. The committee will pave the way for conference discussion of resource problems associated with such minerals as iron, copper, lead, zinc, and bauxite. Other committee members include **Philip J. Shenon**, consulting geologist of Salt Lake City, Utah; **Christopher M. Granger** of Bethesda, Maryland, formerly with the U. S. Forest Service; **Robert Koenig** of New York City, mining engineer and president of Cerro de Pasco Corporation of New York; **Harold F. Mills** of Humboldt, Arizona, manager of the Iron King Branch of the Shattuck Denn Mining Corporation; **Donald Montgomery**, chief of the Washington office of the United Auto Workers, CIO; **W. M. Peirce** of New York, licensed plant engineer with the New Jersey Zinc Company; **Louis Ware** of Winnetka, Illinois, mining engineer and president of International Mineral and Chemical Corporation of Chicago; and **Howard I. Young**, of St. Louis, Missouri, president of the American Zinc, Lead and Smelting Company.

Paul A. Siniabo has retired as superintendent of construction for the Miami Copper Company of Miami, Arizona after 20 years of work for the firm. He will make his home in Phoenix, Arizona.

Charles Will Wright hastened back from Mexico on August 27 to attend the funeral of his brother, Dr. Fred E. Wright, geologist, who was buried at Mt. Royal Cemetery in Montreal, Canada, on August 29. He and Mrs. Wright then went to Nova Scotia to attend the joint meetings of the A.I.M.E., C.I.M.E., and the M.S.N.A. at the Keltic Lodge. Mr. Wright stopped in Washington, D.C. on his way back to Mexico.

Wayne E. Seppanen, chief engineer, has been promoted to assistant general superintendent of Pickands Mather and Co. on the Menominee Range in Michigan. **Richard Brewer**, assistant chief engineer, will succeed Mr. Seppanen as chief engineer, and **Milton Choquette** will be mining captain

A. C. RICHARDSON has been appointed Technical Director of the Battelle Institute of Columbus, Ohio.

For the past 20 years, he has been in charge of research in mineral processing at the institute, which has a \$13,000,000 yearly research program for industry and government. Mr. Richardson has made many research investigations in minerals beneficiation, coal preparation, and extractive metallurgy.



at the New Lawrence mine in Crystal Falls, Michigan.

H. U. Ross, assistant professor of metallurgical engineering at the University of Toronto, Canada, has joined the Arthur G. McKee Company in Cleveland, Ohio, as a consultant for the firm.

Dr. Robert J. Wright has been appointed chief of the geologic branch of the exploration division of the Grand Junction operations office, United States Atomic Energy Commission. Dr. Wright was assistant chief of geology at Grand Junction after working for the New York AEC branch.

G. S. Hayden, mining engineer, is with the engineering department of the M. A. Hanna Company on the Mesabi Range in Minnesota. Formerly, he was with the engineering department of the Kennecott Copper Corporation at Ray, Arizona.

Dr. George A. Kiersch has been appointed director of the mineral resources survey of Navajo-Hopi Indian Reservations in Arizona for the Uni-

versity of Arizona. He succeeds Professor **E. D. McKee** who resigned to join the United States Geological Survey in Denver, Colorado. All mineral resources, exclusive of uranium and groundwater, which have a present value or a future potential are being investigated under terms of a contract between the Bureau of Indian Affairs and the University. Dr. Kiersch has been serving as supervisor of the field operations since June of 1952.

John F. Hogerton has been appointed director of the Division of Public Information Service of the United States Atomic Energy Commission's New York Operations Office. Mr. Hogerton replaces **Corbin Allardice** who has resigned to become Executive Director of the Joint Congressional Committee on Atomic Energy.

In addition to the group of United States Congressmen (see MINING WORLD, October 1953, p. 79) who recently visited uranium mines in Africa, other United States visitors were Joint Committee Staff representatives **Corbin C. Allardice** and **Edward R. Heller**; Atomic Energy Commission representatives, **J. Campbell**, **E. C. Hitchcock**, **E. R. Trapnell**, and **Jesse C. Johnson**, Director of Raw Materials. Major **N. Wreidt** represented the Military Liaison Committee.

Austin Dunn began his term as a member of the Governing Board of the Oregon State Department of Geology and Mineral Industries on August 1. He replaced **H. E. Hendryx** who resigned for health reasons. Mr. Dunn is an attorney in Baker, Oregon, and a former State senator.

William E. Mahin has been appointed technical director of the Van-



H. L. McKinley, center, has been appointed general manager of the United States Vanadium Company, a division of the Union Carbide and Carbon Corporation. He has been engaged as a metallurgist and general superintendent for the company since 1940. **A. P. Cortelyou**, left, newly appointed vice president, has served as general manager since 1951 and has been with Union Carbide since 1930. **O. F. Holmgren**, right, new executive vice-president of U. S. Vanadium, has been with Union Carbide since 1924, with U. S. Vanadium since 1942, and was appointed vice president in 1948. Mr. McKinley will be at the Pine Creek mine near Bishop, California where U. S. Vanadium has substantial tungsten operations. He will also supervise the company's extensive uranium and vanadium operations in the Colorado Plateau area. Mr. Cortelyou and Mr. Holmgren will continue to make their headquarters in New York City.

adium Corporation of America. He will supervise Vanadium Corporation's research center now under construction at Cambridge, Ohio.

William Wright of Virginia, Minnesota, has retired from his position as assistant superintendent of the Rouchleau iron mine of the Oliver Iron Mining Division, U. S. Steel Corporation, on the Mesabi iron range after 47 years with Oliver.

Joseph W. Joyce has succeeded **Dale Matthews** as superintendent of the U. S. Atomic Energy Commission's mill in Monticello, Utah. Before going to Monticello, Mr. Joyce was with the Vermont Copper Company, Inc. at South Strafford, Vermont and with the Division of Industrial Research at Washington State College.

Bruce Hardman is superintendent of mines of the San Juan Leasing Company at Slick Rock, Colorado.

Todd Davis has been appointed to the position of training and public relations director of the Nevada Mines Division of the Kennecott Copper Corporation at McGill. **D. K. Stark** will continue in his job as director of employee relations.

Dr. Robert Franklin Mehl, director of the metals research laboratories and professor of metallurgy at Carnegie Institute of Technology, is the recipient of the Francis J. Clamer medal given by the Franklin Institute of the State of Pennsylvania. The citation accompanying the award states that Dr. Mehl is being honored for "his numerous useful contributions in the fields of theoretical and applied metallography and metallurgy."

J. F. Havard, former assistant resident manager of the Potash Company of America at Carlsbad, New Mexico, has accepted a position as general manager of operations for a Pacific Coast manufacturer of building and industrial materials.

Professor Harold L. Walker left his position as head of the department of mining and metallurgical engineering at the University of Illinois in September to become a partner in the M. & N. Engineering Company at its Taunton, Massachusetts, branch. Professor Walker will serve as technical consultant for the company.

Karl R. Brunt of Pittsburgh, Pennsylvania, former labor relations analyst, has been appointed training supervisor for the Jones & Laughlin Steel Corporation.

Carey Thompson, mining engineer formerly with ACCA Engineering Company of Los Angeles, California, is now employed by Toiyabe Mining and Milling Company of Gabbs, Nevada.

Harley Phillips of Kaiser Aluminum and Chemical Corporation has replaced **H. S. (Pete) Fowler** as general superintendent of fluorspar operations in Fallon, Nevada. Mr. Fowler is now doing exploration work for Kaiser. His headquarters are in Oakland, California.

William F. Sloan, formerly with the Andes Copper Mining Company at Potrerillos, Chile, is now residing in El Paso, Texas.

E. Warren Peterson has been appointed to succeed **R. O. Marsten** as

superintendent at Inland Steel Company's Sherwood Mine at Iron River, Michigan. Mr. Marsten resigned recently after having served as engineer and mine superintendent since 1946. Mr. Peterson has been mechanical engineer for the iron mining department with headquarters at the company's general offices at Ishpeming, Michigan.

Charles R. Bird has been appointed pension plan administrator for the Western Mining Divisions of Kennecott Copper Corporation. He has been with Kennecott since 1937.

Kenneth J. Weber of Manistique, Michigan and **George A. Mattson** of Butte, Montana, have joined the staff of the M. A. Hanna Company on the Mesabi iron range. Mr. Mattson was with the engineering department of the Anaconda Copper Mining Company in Butte.

Board of directors of the newly formed Tungsten Institute in Washington, D. C., include **K. C. Li**, president of Black Rock Mining Company; **Roy A. Hardy**, consulting engineer for Gatchell Mine, Inc.; **John M. Heizer**, president of the Wolfram Company; **John W. Hoefling**, president of the Surcuse Mining Company; and **A. R. McGuire**, Western mine manager of the Nevada Scheelite Division of Kennametal, Inc.

Norman A. Moberg has been promoted to manager of mining engineering for U. S. Steel's Oliver Iron Mining Division. **Ralph W. Marsden**, geologist, has been made manager of geological investigations.

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ACTIVITIES OF INTERNATIONAL MINING MEN

GABRIEL KRISTOS MAR-SIE-HAZEN, deputy director of Ethiopia's Department of Mines at Addis-Ababa, has been in the United States under the Leader Grant Program sponsored by the United States State Department.

During his 90-day tour of various mining operations, Mr. Mar-sie-Hazen visited the Mesabi Iron Range; Anaconda Copper Mining Company at Butte and Anaconda, Montana; Climax Molybdenum Company at Climax, Colorado; gold operations at Cripple Creek, Colorado; Utah Copper Division of Kennecott Copper Corporation at Bingham Canyon, Utah; and regional offices of the United States Geological Survey and the United States Bureau of Mines in the western states.



V. A. Brussolo, former vice-president of Soriano y Cia., is now connected with the United States Defense Minerals Procurement Agency in the Minor and Light Metals Section in Washington, D. C.

Vincent G. Rumph, formerly mining engineer for Telluride Mines Inc. of Telluride, Colorado, has been appointed to the engineering staff of Compania Minera Choco Pacifico in Colombia, South America.

C. H. Dewey, manager of iron ore operation in Liberia for the Liberia Mining Company, has been vacationing in the United States.

Edward Eriksen, professor of engineering mechanics from the University of Michigan, has joined the faculty of the University of the Philippines.

W. L. Dotson, formerly of Golden, Colorado, is now with Cia. Minera Asarco in Parral, Chihuahua, Mexico.

E. J. Perry, formerly with the Smelter Division of Falconbridge Nickel Mines, Ltd., is now with Giant Yellowknife Gold Mines Limited of Yellowknife, Northwest Territories, Canada.

Miguel Simon, Jr. is mill shift boss for the Balatoc Mining Company in Baguio City, Philippine Islands. Formerly he was with Atok-Big Wedge Mining Company.

H. B. Hanson, general manager of the San Francisco Mines of Mexico, Limited in Chihuahua, Mexico, recently returned to Mexico after visiting mining properties in Africa.

H. F. Brownhill, formerly with the American Smelting and Refining Company in Bolivia, recently became manager of the Frontino Gold Mines, Limited, in Segovia, Antioquia, Colombia. He replaces H. I. Altshuler who is now in New York, New York in a consulting capacity.

G. E. Pearson has been appointed secretary of the Federated Malay States Chamber of Mines and the

Malayan Mining Employers' Association. He will assume his duties when he returns from leave in January.

William F. Keyes, Jr., United States Bureau of Mines commodity industry analyst, will make a two-month study of mineral resources and newer mining developments in connection with special foreign minerals reports for use by private industry and the government. His study will include Australia, New Zealand, the Fiji Islands, New Caledonia, Tasmania, and the King Islands.

G. O. Deshler, consulting metallurgical engineer for the San Francisco Mines of Mexico, Limited in San Francisco Del Oro, Chihuahua, Mexico, is now in Tucson, Arizona.

H. S. Lee has been elected president of the All-Malaya Chinese Mining Association. Other officers include **Lau Pak Khuan**, vice president; **Chong You Shin**, secretary; and **Chan Kwong Hon**, treasurer.

Sir William Penney, British atom scientist, will attend the atom test at Woomera, Australia. Great interest has been aroused by the test, especially since publicity about the possible explosion of a cobalt bomb. Reports state that titanium alloys will be tested for resistance to elevated temperatures.

T. R. Wearing, former manager at Pamour Porcupine Mines, Limited, Pamour, Ontario, has become mill superintendent at Gaspe Copper Mines Limited, Murdochville, Quebec.

Gale A. Hansen, former mine superintendent of Cia. Minera Aguilar at Tres Cruces, Province of Jujuy, Argentina, is now residing in Heber City, Utah. Cia. Minera Aguilar is a subsidiary of St. Joseph Lead Company which has headquarters at Bonne Terre, Missouri.



LEROY FRUAN (right) of the power division, Central Engineering Department, American Smelting and Refining Company, Salt Lake City, Utah, recently visited Mount Isa Mines, Limited at Mount Isa, Queensland, Australia. Of particular interest to Mr. Fruan was the blower equipment for the copper converter plant. He is pictured with **IAN MCGREGOR** of Ingersoll Rand Pty., Limited of Melbourne.

RUSSELL R. BRYAN, JR., mine superintendent at the Cerro Bolivar, Venezuela iron ore project of the Orinoco Mining Company, is on a two-months vacation leave in the United States. Orinoco is a subsidiary of the United States Steel Corporation.



Jack V. Everett, who is a geologist for the W. S. Moore Company, recently headed an iron ore exploration party in Quebec.

Sydney Nashner has been appointed technical assistant to the president of Sherritt Gordon Mines, Ltd., of Toronto, Canada. Mr. Nashner formerly was associated with the Chemical Construction Corporation. He designed the new Sherritt Gordon Nickel Refinery at Fort Saskatchewan, Alberta, Canada.

R. B. Allen, chief geologist for Canada's Eldorado Mining and Refining Company, recently said that the Northern Territory Rum Jungle field in Australia may prove to be one of the world's largest uranium areas. Mr. Allen is investigating uranium resources for the federal government of Australia.

J. F. van Kersen, geologist, is conducting bauxite explorations near the Onverdacht mine for the Billiton Company, Ltd., of Surinam, South America.

Keith Whiting, former Northwest geologist for American Smelting and Refining Company, with headquarters in Wallace, Idaho, and who has been head of exploration and engineering for ASARCO's western division in Salt Lake City, has been placed in charge of the company's new office in Toronto, Canada.

The United Nations Iron Ore Resources Committee includes the following men: **F. Blondel**, chairman, director of the Bureau of Geological Studies and Colonial Minerals of Paris; **C. B. E. Dutton**, of the U. S. Geological Survey and the department of geology, University of Wisconsin; **N. S. Krishnan**, director of the geological survey of India; **Benjamin Leiding Vales**, consulting geologist of Santiago, Chile; **F. C. Percival**, consulting geologist, British Iron and Steel Corporation of England; and **F. Martin Wiberg**, professor of metallurgy, Royal Institute of Technology, Stockholm, Sweden.

K. Richardson who is general manager of Johannesburg Consolidated Investment Company, Ltd., has been elected president of the Transvaal, South Africa, Chamber of Mines. **C. B. Anderson**, director of the Union Corporation Ltd., and **B. L. Bernstein**, managing director of Anglo-Transvaal Consolidated Investment Company, Ltd., were elected vice presidents.

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INTERNATIONAL NEWS

First Year of Bolivian Nationalized Mines

The Corporation Minera de Bolivia celebrated its first birthday on October 31, 1953. It is the government-owned corporation which has administered the 23 mining units nationalized by the Bolivian government following the last Bolivian revolution. The mines formerly were operated by Patino Mines and Enterprises Consolidated, Aramayo Mines in Bolivia Company, and Mauricio Hochschild SAMI.

Many of the mines have increased production during the last year. It is known that many more men are employed because all of the miners dismissed and laid off since 1947 have been reemployed.

To date, no accurate figures have been released regarding the cost of production, but costs most certainly have not been reduced. Bolivian estimates vary between \$1.12 and \$1.25 per pound of tin. The recent contract with the Reconstruction Finance Corporation calls for sale of 10,000 tons of tin at the New York market price as of date of delivery. This price has fluctuated within a few cents of \$0.80 per pound in recent weeks.

Costs are hard to ascertain for another reason—currency restrictions and exchange rates change. The current rate is \$1.00 U. S. for 190 Bolivianos, less 35 Boliviano tax. There is of course another tax on operations.

Drill for Nickel-Platinum In Rhodesia's Great Dyke

The Rhodesian Great Dyke Exploration Syndicate has started to drill a 4,000-foot-deep, vertical diamond drill hole in the center of the Great Dyke, south of Belingwe, Southern Rhodesia. An exclusive prospecting right to this area is held by the Wedza Syndicate Ltd.

The Rhodesian Great Dyke is an "abyssolithic (that is, bottomless) dyke" traversing the country for 365 miles in length, from near the Zambezi River in the north to the Limpopo River in the south with an average width of three miles. The Dyke is composed of ultrabasic rock and has been correlated to the Bushveld igneous complex in South Africa.

Most of Rhodesia's 35,000 tons of chrome ore produced monthly are derived from five to seven narrow chrome seams occurring with unique regularity over most of the 365-mile strike length. The chrome ore occurs in the upper section of the Great Dyke in the form of sheeted and flat synclinal structures, the seams dipping from the sides of the Dyke towards its center. Apart from chrome, traces of nickel and a low-grade platinum-bearing norite-rock horizon have been found in the Dyke. However, geological interpretations of the Great Dyke indicate the possibility of a high specific gravity linear core beneath the surface near the chrome horizon. A gravimetric and magnetic survey carried out by Dr. Oscar Weiss for the Rhodesian government has

confirmed the existence of this core below the outcrop of the Great Dyke rocks. It is believed that certain mineral concentrations, especially of the nickel-platinum group, may be found in depth in this first deepest borehole on the Great Dyke, which continues to rouse great interest. The borehole was sited at the geologically lowest Dyke horizon by J. C. Ferguson, director of the Southern Rhodesia Geological Survey.

Uranium Detection Logging Unit Developed By US AEC

A new drill-hole logging unit for detection and evaluation of uranium has been developed and satisfactorily tested by the United States Atomic Energy Commission. The recording section of the instrument, which is lighter, more portable, more versatile, and cheaper to build than previously built instruments, measures approximately 20- by 12- by 12-inches and weighs less than 100 pounds including 2,000 feet of cable. It requires less than one half the power used for an automobile radio for its complete operation including electric drive for the cable reel.

The unit, designed and fabricated by engineers of the Instruments Branch of AEC's New York Operations Office, can be built for one-fourth the cost of other equipment designed to do the same job. It has the capacity and sensitivity of earlier, more bulky equipment and it does not require truck mounting and high-powered electric generators for operation.

The unit has been designed to use either a scintillation counter or a Geiger counter as the radiation detector, depending on the size of the drill hole. The probe housing the scintillation counter is two inches in diameter and the one housing the Geiger counter is one inch in diameter. Both units are self-powered by hearing-aid-type batteries.

With this instrument, the amount of radioactivity and the depth at which it is located are automatically recorded above the ground as the probe is lowered down the drill hole. Measurements can be taken at the rate of one foot or 10 feet per minute.

Dr. Phillip L. Merritt, head of the AEC's exploration program, has said that AEC survey teams will be equipped with the units as soon as they are available.

To Recover Iron Sinter From Sudbury Nickel Ore

Construction of a \$16,000,000 pyrrhotite treatment plant to recover by-product iron sinter from nickel ores in the Sudbury district of Canada has been started by the International Nickel Company of Canada, Ltd. The new plant will supply iron sinter higher in grade than any now produced in quantity in North America, containing at least 65 percent natural iron and less than 2 percent silica.

A revolutionary new process developed by the company's research staff makes possible this treatment of lower grade Sudbury ores which, until now, were considered uneconomical. Nickel production has always meant that the iron content of the ore would be rejected in slag or tailing. The Inco method not only permits recovery of high-grade iron, but is also of importance in opening the way for increased recovery of other elements, including sulphur, from the complex Sudbury ores.

Initially, the plant will treat 1,000 tons per day of nickel-bearing pyrrhotite ($\text{Fe}_{10}\text{S}_{12}$) removed from ore in the early stages of processing at Copper Cliff, Ontario. Ultimately, the operation will yield about 1,000,000 tons of high-grade iron a year in addition to the nickel from these ores.

ASARCO Asks Government Loan For Peruvian Copper

Dr. Milton Eisenhower reportedly may recommend reconsideration of a United States government loan of \$120,000,000 to American Smelting and Refining Company for development of the latter's Toquepala copper project in Peru. Estimates are that the Toquepala development could produce 100,000 tons of refined copper per year. The deposit which ASARCO wants to develop is said to have an estimated reserve of 350,000,000 tons of better than 1 percent ore.

Consideration of the loan was halted shortly after the new Administration took office by an ODM order freezing negotiations on all contracts not signed. The company reportedly has put between \$6,000,000 and \$8,000,000 into the development and proposes to invest another \$40,000,000.

Granby Reports Two Copper Finds in British Columbia

Diamond drilling has indicated two prospective copper ore bodies and possible extensions on the Granduc mines properties of the Granby Consolidated Mining, Smelting & Power Company on the northwest coast of British Columbia. Work completed on the property this season included 830 feet of tunnel and 4,485 feet of diamond drilling.

The first ore body was investigated by 15 diamond drill holes and tunneling. It apparently has a length of at least 900 feet, an average width of 27 feet, and a copper content of about 2 percent. Another ore body was located on the surface about 500 feet east of the first and roughly paralleling it. Three drill holes indicated a length of at least 400 feet with both the width and grade appearing to be better than the first. Additional surface exposures were shown which may prove to be extensions of these ore bodies or separate ones. Work is expected to resume on the properties in the spring of 1954.

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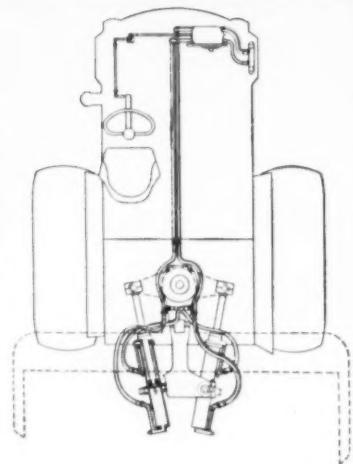
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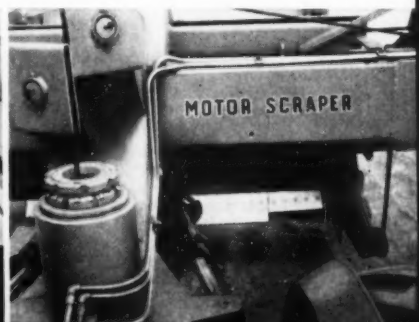
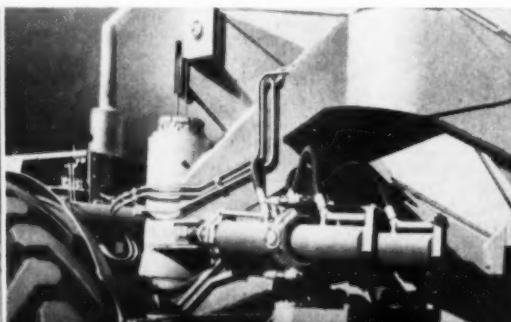
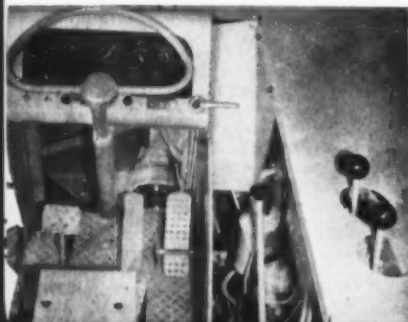
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OCEANIA

NORTHERN TERRITORY—Bauxite on Marchinbar Island is said to assay 46 percent soda-soluble Al_2O_3 and 5.6 percent SiO_2 ; 10,000,000 tons have been proven. The Australian Aluminum Production Commission has withdrawn reward offers for further discoveries following the discoveries of bauxite in the Northern Territory. Adequate reserves appear to be available now for Australia's future needs. The metallic aluminum plant at Bell Bay, Tasmania may be completed next year.

PHILIPPINE ISLANDS—*Soubra Mines, Inc.*, organized to operate mining properties in the Philippines, has begun operation of the *Agusan* mines at Paracale, Camarines Norte. The new mining concern is interested mostly in the extraction of iron ore, chromite, manganese, and copper.

VICTORIA—*Morning Star (G.M.A.) Mines N.L.* at Wood's Point has begun new shaft sinking operations at its mine which is one of the oldest in the country. In the year ended March 31, the company treated 19,606 tons for a recovery of 15,548 ounces of gold. This was an increase of 5,869 ounces over last year's production. Ore reserves are estimated at 50,500 tons averaging 15.5 dwt. Electric power is now available from the State Electricity Commission following completion of a power line. This is expected to greatly reduce costs and permit mining of lower grade ores.

PHILIPPINE ISLANDS—United States shareholders in *IXL Mining Company*, *Antamok Goldfields Mining Company*, and *Masbate Consolidated Mining Company* may send their certificates to *Ansor Corporation* at 212 Stockton St., San Francisco, California, to be exchanged for shares of the newly organized *Atlas Consolidated Mining & Development Corporation* of Manila which was formed by the merging of these firms into Atlas. Conversion rate is as follows: for IXL shares, 0.825 of Atlas for one share of IXL; for Antamok, 0.75 of Atlas for one of Antamok; shares of Masbate (the old name for Atlas) will be replaced under the new name.

WESTERN AUSTRALIA—*Consolidated Gold Mining Areas N.L.* has taken over the operation of the *New Lancefield* mine at Beria pending organization of a new working company called *New Lancefield*. Recent work indicates that there is a substantial northern extension of the Lancefield ore shoot. Crushing is at the rate of 500 tons monthly at the Laverton state stamp battery and will be increased to 1,000 tons per month.

NEW ZEALAND—*Kanieri Gold Dredging Ltd.* at Kanieri produced 794 ounces of bullion from 254,000 yards dredged during August. The dredge has now ceased operations and is being dismantled for transfer to Taramakau.

QUEENSLAND—*Mount Morgan Ltd.* mined 62,350 tons of ore in four weeks ended August 23. Production was 5,544 ounces gold and 564 tons blister copper. The smelter is presently shut down for repairs and extensions to the reverberatory furnace. A suspended roof will be added.

NOVEMBER, 1953

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NEW SOUTH WALES—*Tungsten Consolidated Ltd.*, whose property is at Frogmore, in four weeks to September 2 milled 342 tons of ore for five tons of first-grade concentrate. Output until the end of December has been sold in advance at 352/6 per unit.

TASMANIA—*Montana Silver Lead N.I.* at Zeehan is installing a filter and a drier with an infrared ray attachment designed to reduce water in the concentrate from 8 to 2 percent. Production goal is 125 tons monthly. Zeehan was a large silver-lead producing area 50 years ago, and a group from Broken Hill, New South Wales are currently drilling the *Oceania* mine there.

VICTORIA—Production of crocidolite by *Australian Blue Asbestos Ltd.* of Wittenoom Gorge is now at a record rate of over 4,000 tons per year. The company employs 250 men and plans to increase output to 8,000 tons annually at a cost of £300,000. At Gwalia, *Sons of Gwalia Ltd.* treated 95,494 tons in 1952 for a recovery of 23,768 ounces of gold. Ore reserves are estimated at 572,222 tons at 5.46 dwt. per ton. In four weeks to August 11, the mine treated 9,536 tons for 2,030 ounces of gold.

NORTHERN TERRITORY—At Tennant Creek, exploratory diamond drilling has started on leases held by H.I.C. Connolly adjacent to *Peko (Tennant Creek) Gold Mines N.L.* Peko is proceeding with foundations for a new plant which includes a leach plant and fluo-solids roasting. Underground development is proceeding.

NEW ZEALAND—*Arahura Gold Dredging Company, Ltd.* of Hokitika produced 556 ounces of bullion from 227,000 yards dredged during the month of August.

VICTORIA—*Western Mining Corporation Ltd.* more than doubled its profit in the year ended March 31, with a figure of £822,755. An important factor was the great increase in gold output and dividends by *Central Norseman Gold Corporation N.L.* at Norseman, where developments continue to be most encouraging. Process trends in mines operated under the Western Mining Corporation are said to be: use of rod mills; use of larger units generally; adaptation of Devereaux agitators; use of variable speed drives on equipment; and reduction in shift operators to control labor charges.

NEW SOUTH WALES—In the year ended May 31, the *Broken Hill Proprietary Company Ltd.* made a profit of £A2,648,840, an increase of £733,607. Orders for products are increasing after a period of slackness. Rolling of heavy plates in the hot roughing section of the new hot strip mill at Port Kembla will begin early in 1954. Construction progress is being made with the rest of the plant. Iron and steel output at the company's three plants (*Broken Hill* at Newcastle; *Australian Iron and Steel* at Port Kembla and Whyalla) have shown increases during recent months. Ore shipped from Whyalla in South Australia in August was 207,000 tons.

PHILIPPINE ISLANDS—Two members of the United States Atomic Energy Commission are reported to have concluded a two-month survey of possible uranium deposits in the Philippines, particularly in the area near Los Banos, south Manila. It was in this area that Eric C. Huzenlaub, a Texas chemist, is reported to have found an extensive uranium field earlier this year. No disclosure has been made regarding the findings of the AEC experts.



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FULL-BLOODED NAVAJO OPERATOR finds "Big Red's" power easy to handle on New Mexico's only strip mining operation. Partners Earl Roberts and Phil Breedlove look on at right.

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Ripping off a 20-foot sandstone overburden, without shooting, an International TD-24 crawler is moving 700 cubic yards a day to get at the coal for Roberts & Breedlove, Gallup, New Mexico.

Using Navajo Indian operators, the company produces about 100 tons a day, plans to increase output to 250 tons. Overburden is pushed back into worked-out strip, or over the mountainside.

Earl Roberts, partner in the company, tells how the TD-24 makes this stripping operation profitable:

"By using a special ripper tooth, we are able to rip sand and rock, and move it at

the same time. Formerly we had to shoot the overburden and then move it, so the TD-24 means money saved for us. That TD-24 sure is powerful. I don't think any other tractor could do the job ours is doing."

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AFRICA

NORTHERN RHODESIA—Mufulira Copper Mines Ltd. will increase production at its copper mine from 300,000 to 360,000 short tons a month. The £2,000,000 development program is being carried out on the 1,650-foot level. Hoist stations are being cut to house machinery which will serve the three inclined winzes. A jaw crusher will be installed at the 1,760-foot level and a gyratory crusher will be installed at the 1,820-foot level. This is said to be the only mine in Africa which will have large ore crushing stations below the surface. The Boise No. 5 shaft will be re-equipped with a new head frame and hoist house; after this installation is completed, the shaft will switch from 3-ton skips to 11-ton skips.

NYASALAND—Corundum production is decreasing; during 1952 only 102,000 pounds were produced. Corundum deposits occur in the Tambani Mountains near the Mozambique border. The mineral is mined by primitive methods of picking and washing the eluvial surface rubble layers.

GOLD COAST—The chairman of *Taqaah and Aboosso Mines Ltd.* reports that the mines suffered an operating loss of £22,184 for the year ended March 31. During last year, 274,000 tons of ore were treated for a recovery of 64,602 ounces of gold; in the previous year, 257,000 tons were treated to recover 60,466 ounces of gold. The company stopped new exploration work last year and ore reserves decreased by 238,000 tons to 831,770 tons. Mine working costs, excluding development, were higher than in the previous year. However, during the first three months of this year, the amount of ore broken by each rock drill increased by 25 percent after the introduction of tungsten carbide-tipped drill steel. F. H. Upcott, general manager of the mines, reports that the installation of a third Oliver filter with auxiliary equipment is giving good service in the mill. G. Keith Allen, chief engineer and resident director of the mine, reports that any increase in basic wages or costs of supplies imperils the future of the mine.

SOUTHERN RHODESIA—Minex Ltd. of Johannesburg, controlled by the German group *Otto Wolf*, is investigating the *Alton-Plum* scheelite claims at Mazoe, owned by the *Alton Tungsten Mining Company, Ltd.* of Salisbury. A drilling program carried out in 1952 reportedly proved an 82-inch-wide scheelite lode averaging 0.93 percent WO_3 over 600 feet of strike length. The indicated ore reserve is said to be 60,000 long tons. The total known strike length is 1,650 feet. The scheelite lode occurs in calcareous sediments of the Basement Series and trends parallel a short distance from the intrusive granodiorite contact line.

GOLD COAST—Bremang Gold Dredging Company Ltd. produced 34,969 fine ounces of gold for the year ended December 31, 1952, as compared with 40,861 fine ounces in the previous year. In dredging, the aggregate throughput was lower

than in 1951. This was due to the fact that No. 2 dredge had worked through its ground on the Ankobra River and had ceased operating in July 1952. The dredge was dismantled and transferred to the *Bremang Extended Areas (Offin)* where it will be in operation shortly. Returns for the first half of this year show that 3,547,300 cubic yards have been treated for a recovery of 16,911 ounces of gold. These figures show a reduction of just under 200,000 cubic yards treated and 2,000 ounces of gold less recovered. However, four dredges were operating last year and only three were in operation during the first half of this year.

UNION OF SOUTH AFRICA—During the month of August, *West Rand Consolidated Mines, Ltd.* milled 227,000 tons to recover 31,093 ounces of gold. The *South Roodepoort Main Reef Areas Ltd.* milled 27,500 tons during that month and recovered 5,989 ounces of gold.

SOUTHERN RHODESIA—Magwaza Chrome Mines, controlled by F. D. A. Payne, is developing, by pitting and shallow boreholes, an 8-mile-long stretch of eluvial chrome at the foot of the Great Dyke serpentine hills, south of M'toroshanga Pass. A total of 167,000 long tons of eluvial material were proved containing 16.43 percent Cr_2O_3 . The estimated tonnage reportedly runs into many millions. Development work is in progress. Concentrating tests proved that the chrome concentrate could be brought up to 54

percent Cr_2O_3 with a chrome-to-iron ratio of 2.4:1.0. The alumina and magnesia content amounts to approximately 25 percent. This is the third large eluvial flat which is being proved at the foothills of the Great Dyke in Southern Rhodesia. Another company, *Rhodesian Mining Enterprises Ltd.*, has been operating a concentrator since 1952. The plant, located a few miles north of the *Magwaza* claim holding, treats eluvial chrome from a large flat with excellent results.

SOUTHERN RHODESIA—Beryl production increased to 938 tons for the first seven months of 1953, as compared with 661 tons in the same period of 1952. There were 104 independent small producers during this time, of which 98 were operating in the Salisbury district in the Karoi and Fungwe areas. Beryl is usually mined by handpicking from surface rubble layers of pegmatite dikes; only in a few cases has quarrying or mining been resumed. Rhodesian beryl contains approximately 13 percent BeO .

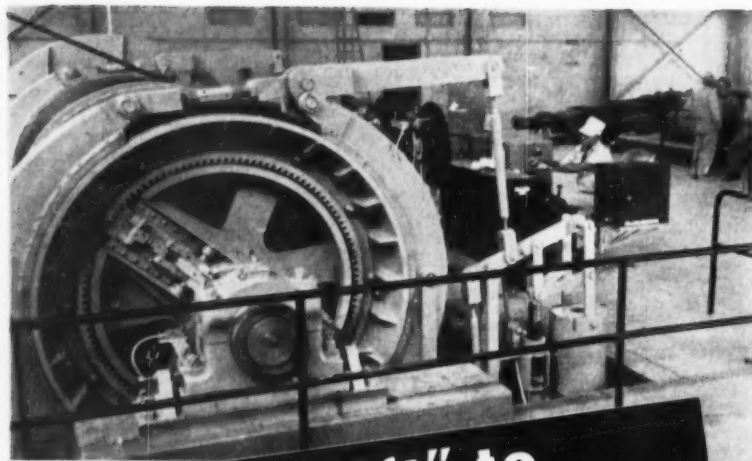
FRENCH WEST AFRICA—The Phosphate Exchange of North Africa reports that a group is exploring an area in the vicinity of the Lama (lower Dahomey State) which has indicated extensive calcium phosphate deposits. The assays are expected to be comparable to North African phosphates.

MOZAMBIQUE—A pitchblende deposit, the first in Mozambique, was recently discovered at the headwaters of



KAMATIVI TIN BUILDS STORAGE DAM

A gravity concentration mill to treat tin-bearing pegmatite, as well as alluvial tin-bearing wash, is being erected on the property of Kamativi Tin Mines Ltd. in Southern Rhodesia. The Dutch firm, N. V. Billiton Maatschappij, has a large interest in the project. Two Denver 24-inch by 36-inch mineral jigs are being installed in the mill. The orebody consists of a series of flatly dipping, sheet-like pegmatites carrying disseminated cassiterite (SnO_2). This tin field represents a portion of the 40-mile-long tin belt which stretches from east to west passing into the Tshontanda wolframite belt. It is believed that columbite and tantalite will be by-products of the company's tin concentration. The shortage of water which has seriously hampered small-scale operations in the past will be overcome by the construction of a large dam in the Kamativi River Valley. In the picture above, the dam site is being cleared with excavation to bedrock. Jigs are used to produce the slimes required as dam filling. The company is also embarking upon a £300,000 development and housing program for European and Native employees.

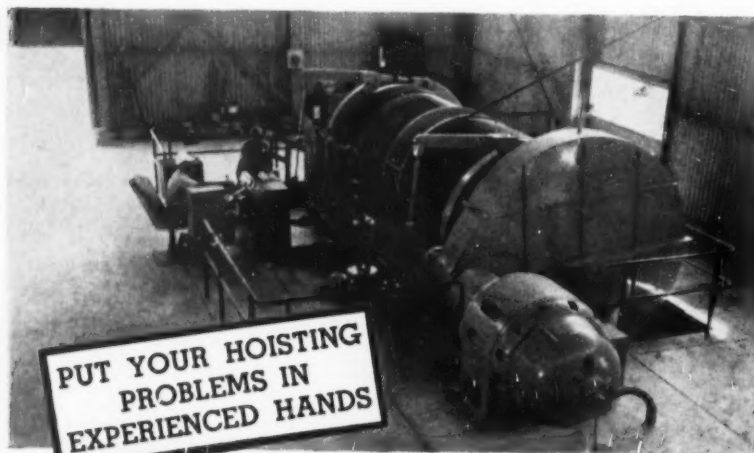


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the Nhaondue River, a few miles north of the Zambezi River near the ancient Zambezi copper fields. Prospecting work is in progress and the first consignment of high-grade, hand-sorted uranium ore has been shipped.



EUROPE

ENGLAND—In a recent interview with a MINING WORLD-WORLD MINING correspondent, Lord Bruce, chairman of the £70,000,000 Finance Corporation for Industry, commented that his demand for a full inquiry into the Commonwealth's resources and their rate of use would enable investments to be made in the Commonwealth where they would accomplish the most satisfactory results. Lord Bruce, formerly Prime Minister of Australia, believes that the Commonwealth is passing quickly from being a net exporter of many important materials including metals to being a net importer. He feels that investments should be made for Commonwealth metal production instead of for importing the metals from North and South America.

YUGOSLAVIA—As indicated by the figures in the table below, Yugoslavian ore and metal production for the first half of 1953 is on its way to being considerably higher than 1952 production. Lead and zinc production have increased considerably. These are important export items as home consumption is only 8,000 tons of lead per year and 10,000 tons of zinc. Electrolytic copper production shows a big increase. Current home consumption of copper is 20,000 tons a year.

**Yugoslavian Ore and Metal Production
In Metric Tons**

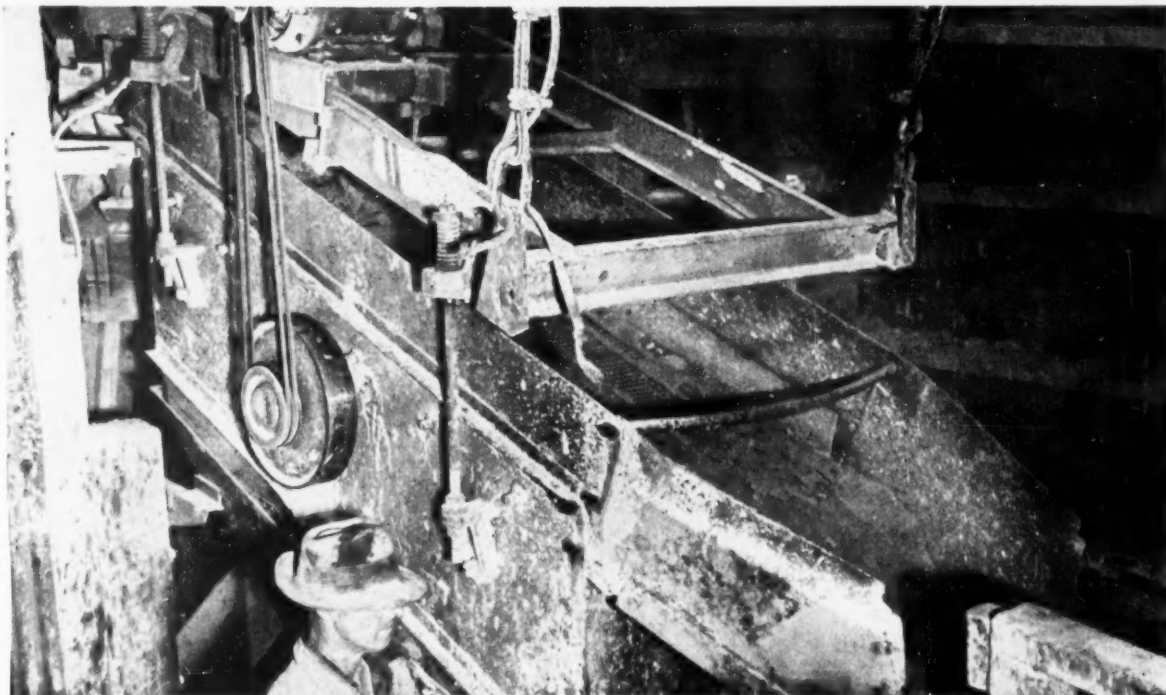
Commodity	1952 (January-December)	1953 (January-June)
Ores		
Lead-zinc	1,203,764	679,900
Copper	1,264,908	648,174
Antimony	74,304	33,059
Bauxite	577,196	231,162
Chromite	107,222	65,041
Manganese	12,687	6,320
Pyrite	20,732	1,849
Pyrite concentrate	167,397	81,835
Metals		
Refined lead	67,180	37,342
Crude zinc	14,463	7,501
Blister copper	32,819	15,100
Electrolytic copper	21,390	12,160
Antimony	1,379	825
Mercury	504	245
Aluminum	2,563	1,623
Bismuth	99	51
Silver	80	48

Antimony production is increasing. Except for less than 400 tons per year, used by domestic industry, antimony is exported, mostly to the United States and Germany. Yugoslavia is the largest chromite producer in Europe and production is rising. Over 80 percent of the total tonnage is exported. Manganese ore deposits are small but rhodochrosite is found in the lead-zinc mines of Trepcja and Zletovo. Pyrite concentrate is mostly from the lead-zinc flotation plant at Bor, Serbia. The ore comes from Majdanpek, Serbia, but production is declining as the mine is being converted for a big production of copper-bearing pyrite. Determined ore reserves are approximately 100,000,000 tons containing 0.9 percent copper and 0.6 grams per ton of recoverable gold. Mercury production at Idria, Slovenia, is at the 500-ton-per-year level.

MINING WORLD

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[World Mining Section—51]

79

Magnesite production was 89,915 tons in 1951 and is steadily rising. Future developments in the Yugoslavian mining industry are indicated. In 1951 nearly all copper exports will cease in order to supply new Yugoslav fabricating plants which are now under construction; a rolling plant at *Sevojno* near Uzice (capacity 17,000 tons), and the *Svetozarevo* cable factory (capacity 15,000 tons), both of which are in Serbia. A United States Export-Import Bank loan is partially financing mechanization of the *Bor* copper mine in Serbia and the installation of a cyanide plant there. A copper and copper-alloy rolling plant at *Sevojno* has been partially financed by German loans. Antimony production is expected to rise to more than 2,000 tons a year. In 1954, home consumption of chromite will be higher because of the *Magnochrom* factory at Rankovicevo, Serbia (for refractory materials) and the new chrome combine, near Skopje, Macedonia which is under construction. Processes for economical extraction of manganese from flotation tailing are being explored and developed at *Zeecan* (Trepcan). A recently discovered magnesite deposit (several million tons estimated) is being explored at *Bela Stena* near Raska, Serbia.

NORWAY—The *Zinkgruvor Company* plans to close down its zinc mines at Nyberget, St. Skedvi, and Dalecarlia due to prohibitive cost of operations.

CZECHOSLOVAKIA—Preparations are underway to mine uranium deposits found last year in the Slovakian area near *Voishenk* and *Grueneval*. The inhabitants of these villages are worried, reports say, because they may have to move from their homes. Political prisoners and other forced laborers will take over the villages and work for the Army-guarded mines, according to reports.

SWEDEN—*Stellebergs Gruv Company* plans to re-open the *Stromhagsgruvan*, an old iron ore mine at Vattholma in central Sweden for a three-year experimental mining program.

SCOTLAND—The *Bangrin Tin Syndicate* is continuing exploration and sampling in the Leadhills district of Lanarkshire. Part of the property has been de-watered.

YUGOSLAVIA—Systematic geological search programs have resulted in the location of rich new iron ore deposits. The *Vares mine* in Bosnia will be enlarged to yield 1,700,000 annual tons in several years, according to reports. New deposits were found near Ljubija. Open-pit mining in the Bosansky area is expected to yield 300,000 tons annually. A deposit said to contain 500,000 metric tons of iron is located near Nova Litica.

PORTUGAL—Portugal will export 80,000 tons of pyrite to Belgium, 45,000 tons to Germany and 10,000 tons to Italy, according to terms of recently signed trade agreements.

GREECE—Bauxite production in Greece totalled approximately 348,500 metric tons for 1952 as compared with 186,000 tons for 1951. Exports, the bulk of which went to Germany, England, and Norway, totalled 301,000 tons.

WALES—Lead production at the *Halkyn District United Mines* in Flintshire, North Wales, continues in spite of the low price of lead. The company is milling about 150 tons per day on a greatly reduced operating schedule. Jigs and tables yield a high-grade galena concentrate; a flotation operation treats the middlings and all fines, recovering both lead and zinc. Much of the galena

is tarnished and some oxidized minerals are present making sulphidizing a necessary step in the flotation treatment.

YUGOSLAVIA—The *Strnice* aluminum plant, which was scheduled to begin operations in October, is completed as far as installations are concerned. However, an electricity shortage will probably delay the start of production.

SWEDEN—Iron ore exports for the first half of the year totalled 6,768,000 tons as compared with 7,139,000 tons for the same period last year.

YUGOSLAVIA—A magnesite processing plant which will make magnesite and chromium-magnesite refractories for Yugoslav iron furnaces is being operated in *Ranko-Vicevo* near Kraljevo. The raw materials come from the solid magnesite deposits between Goles and Drenica.

POLAND—Nova Huta, largest Polish steelworks with a planned annual capacity of 1,500,000 tons of steel, is being rushed to completion with the deadline set for 1955. Poland's second largest plant, operated by the *Czestochowa* combine, is expected to be completed at the same date. Open hearth production, which started several years ago, is expected to reach 1,100,000 tons. According to "Izvestiya," the Moscow paper, a blast furnace is now in service. According to the same paper, output goal for 1955 is 4,500,000 tons.

AUSTRIA—Due to an increased number of electrolysis units at the *Ranshofen* aluminum works, Austrian aluminum production is expected to reach an average of 2,200 tons a month in the months from October 1953 to March 1954. This compares with 1,750 tons a month in the corresponding period last year.

NORWAY—Construction is underway on a plant which will provide hydro-electric power for the *Sundalsora* aluminum plant in West Norway. (see *Mining World*, October 1953, p. 92). The plant will have seven units yielding over 280,000 kilowatts. The first two of these units are nearly ready for operation.

AUSTRIA—Iron ore mined during July of this year reached a high of 258,650 metric tons. Copper ore production was 14,304 metric tons. Lead and zinc ores amounted to 5,981 metric tons and antimony ore production totalled 704 metric tons.

ALBANIA—According to German reports reaching London, Albania plans to produce 120,000 tons of chrome ore a year and 200,000 tons of copper ore a year by 1955. Development of iron ore, nickel ore, bauxite, and pyrite deposits is to be carried out. Planned production is between 10 and 17 times as much as Albania produced before the war.

ENGLAND—New *Consolidated* mine, near Plymouth, closed down earlier this year but part of the plant is being used to treat wolframite ore from the *Teebartha* mine and a detrital deposit, both of which are being operated by an associated company.



LATIN AMERICA

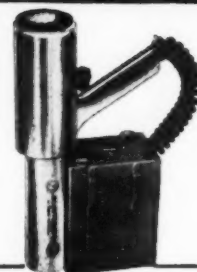
MEXICO—The drop in zinc price is costing Mexico 17,000,000 pesos (\$1,960,000) yearly because that metal is a leader

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Cross section at left shows how KLEEN-SLOT Screens operate on a non-clogging principle.

Kleenslot SCREEN GUARDS

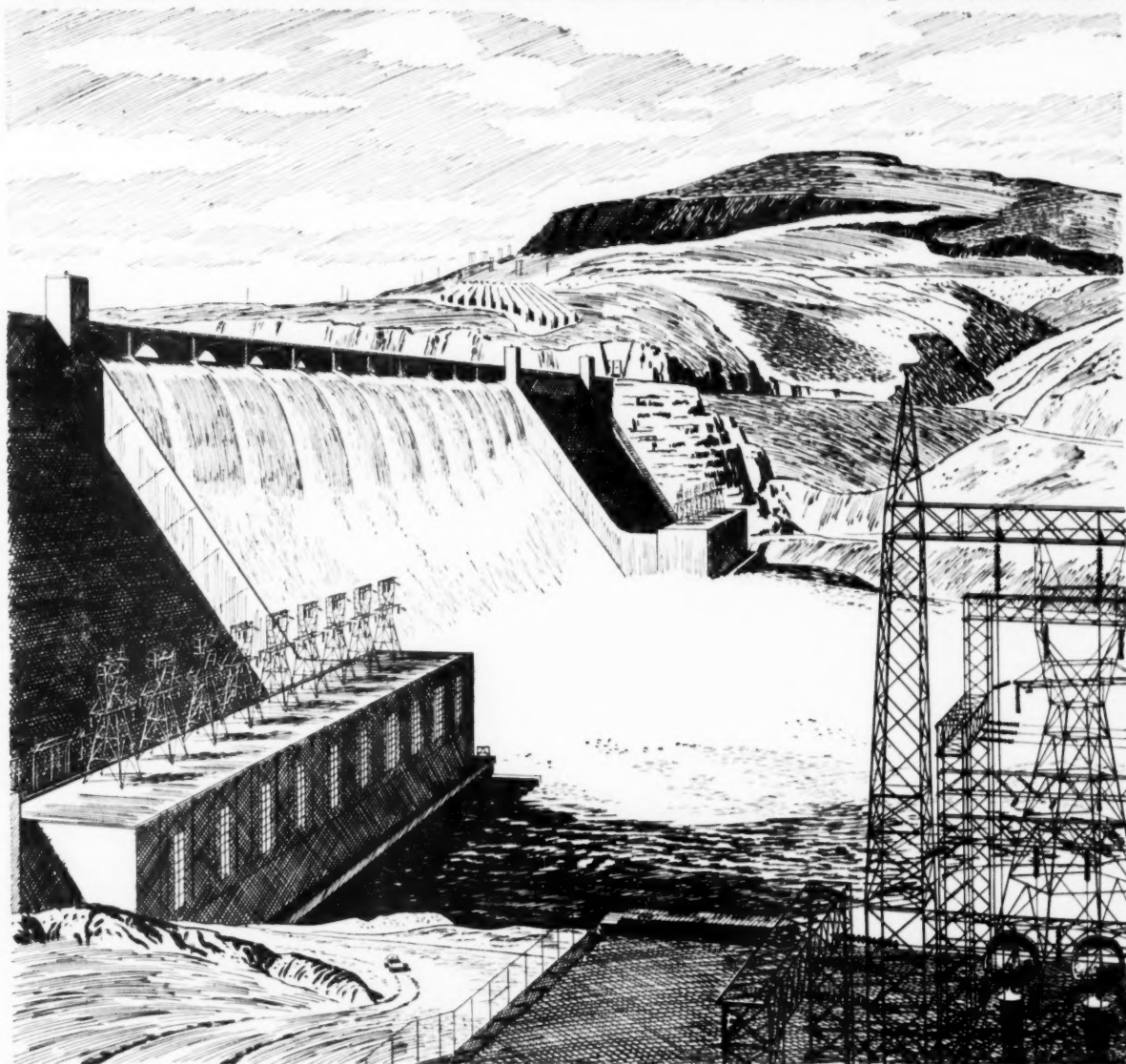
The screen guard is built into the screen and the guard bars permit only the finer particles to pass over the screen. All sizes and most materials furnished.

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Columbia-Geneva STEEL AT WORK IN THE WEST—Grand Coulee Dam, world's largest concrete structure



CONCRETE COLOSSUS...with a backbone of steel!

Begun in 1934, Grand Coulee Dam, the world's greatest producer of hydroelectric power, will eventually supply irrigation water to one million acres of rich, new land in the Columbia Basin area.

Support and strength for Grand Coulee Dam's more than 10 million cubic yards of concrete is 45,000 tons of reinforcing steel, an important share of which came from the mills of Columbia-Geneva.

For any job, big or small—Columbia-Geneva for years has made steel of many types.

Of course, some of these products are in short supply. But we hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer **COLUMBIA-GENEVA STEEL**

Division United States Steel Corporation



UNITED STATES STEEL

NOVEMBER, 1953

[World Mining Section—53]

81

in Mexican mining exports, according to the National Federation of Medium and Small Scale Miners Association. The organization estimates Mexico's annual zinc production at about 200,000 tons, and is extremely pessimistic about the future of zinc in Mexican mining unless there is a noteworthy increase in price or demand. However, the executive vice president of the National Association of Small Scale Miners counts upon a general increase of 10,000 tons worth 10,000,000 pesos (\$1,150,000) in mining production this year as a result of aid in the form of cash subsidies recently ordered for the small and medium-scale branches of the industry. That aid is reported to have directly caused a 2,000-ton increase in lead, zinc, and copper production in August and the Association expects that increase to be at least 4,000 tons in September. These payments are to be made regularly each month to the small and medium-scale mine operators.

COLOMBIA—Aznazu Gold Dredging Ltd., which has been operating two dredges on the Cauca River some 25 miles south of Cali, has offered its No. 2 dredge for sale and has asked for bids. The dredge is a modernized, fast-speed, 12½-cubic-foot bucket dredge, capable of digging to a depth of 35 feet below the water level. It is completely equipped with jigs and with Ward Leonard electric controls. The remaining ground to be dredged will be handled by the company's smaller No. 1 dredge.

ARGENTINA—Several investigations are underway which may lead to the formal exploration of the *Los Arboles* and *Los Viejos* wolframite mines near Fiamhala in the province of Catamarca. Prob-

able ore reserves at the *Los Viejos* mine are estimated at 147 tons of concentrate containing 68 percent WO₃.

VENEZUELA—Construction and installation of new facilities at the *Orinoco Mining Company's Cerro Bolivar* iron ore project are proceeding on schedule and first shipments of iron ore are expected to leave the Puerto Ordaz docks in January 1954. Orinoco is a subsidiary of the *United States Steel Corporation*. The permanent operating staff now being set up includes Morgan Leonard, general superintendent of the Cerro Bolivar area; Russell R. Bryan, Jr., mine superintendent; and Fred W. Wright, Jr., chief geologist.

BRAZIL—Plans for building a 10,000-ton iron ore port at Itacurua, a few miles south of Rio de Janeiro, are moving ahead with the recent establishment of a commission to make definite studies of the project. Aerial surveys of the region will be undertaken soon. The port would also handle about 2,000,000 to 3,000,000 tons of coal a year. At present Brazil's main ore port is Vitoria which last year shipped about 1,500,000 tons of ore. Capacity of this port is to be expanded to 3,000,000 tons within a few years. A large port at Itacurua might well be a solution for rapid transport of ore along the coast to future steel mills in coastal sites, such as the project planned at Piassaguera near Santos, and one which may be built in the state of Catarina.

MEXICO—During July, *Cia. Minera Totocuno S.A.* filed 23 applications to work manganese deposits in the regions of Nochistlan and Etla in Oaxaca State. During that same month, 14 other appli-

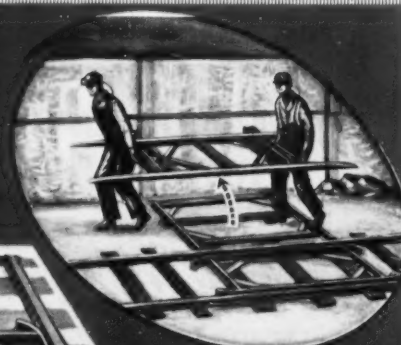
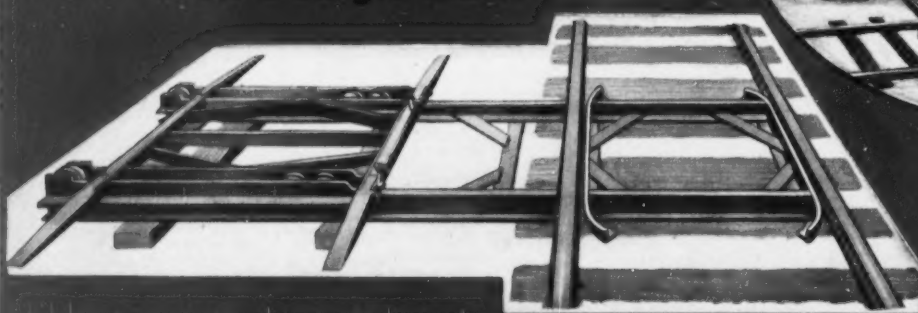
cations for manganese work were filed in the same area by other operators. This was somewhat of a manganese boom for the region, according to the Ministry of National Economy.

COLOMBIA—*Canadian Johns-Manville Company* has temporarily suspended drilling operations on the two asbestos deposits which it has been exploring for the past year in the department of Antioquia. Further drilling of the asbestos showings will depend on the completion of core assaying, which is being done in Canada, and on a re-evaluation of the potentialities of the deposits.

BOLIVIA—The *Bolivian Mining Corporation* and the *United States Reconstruction Finance Corporation* have signed a purchase agreement covering 10,000 tons of Bolivian tin ore and concentrate. This marks the first long-term tin-buying agreement between the two nations since 1950. Under the contract the United States will get about one-third of Bolivia's annual output, most of which comes from mines nationalized last year by the present Bolivian government. It provides for delivery of 10,000 short tons by March 31, 1954 at prices based on New York quotations. Reportedly 5,000 tons are already stockpiled and ready for shipment.

ARGENTINA—The Congress has passed a new law designed to attract foreign investments, including mining. The legislation guarantees "enterprises of national interest" the right to remit up to 8 percent of their profits from the second year of operations, and also allows repatriation of capital by annual installments of up to 20 percent after 10 years.

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with the "Canton Car Transfer."
Loads entire train of empties
on a single track



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No need to dig and take out twice the width of a tunnel when a single track will do the job more economically . . . The "Canton" loads entire train on the single track. This famous economy device can be installed on any track or gauge and rail now in use. Its operation is simplicity itself . . . pushing empty car on track by locomotive then moved by hand to transfer section, permitting locomotive and cars to

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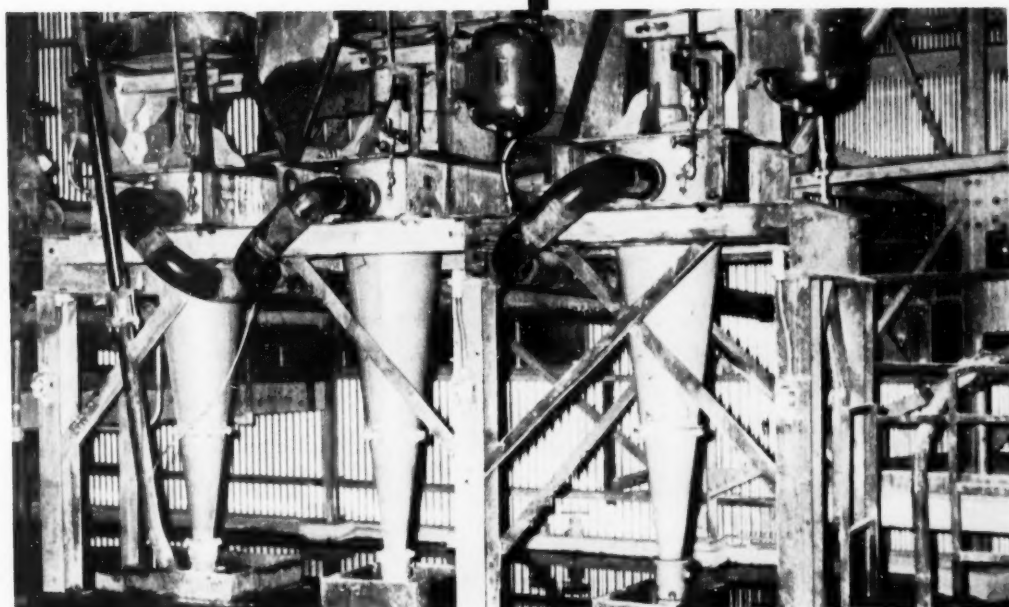
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OLIVER CENTRICLONES

Tungsten Mining Corporation
Henderson, North Carolina



Here's another instance—in connection with ore concentration—where the Oliver Centriclone is doing an excellent classifying job. It is necessary to recover the maximum of values in the fine sizes and to prepare a feed of proper percent solids for the tables.

Possibly you have a classifying step in your flowsheet that is giving trouble; or you are in the planning stage for a new mill where classification will be necessary. Find out more about the Oliver Centriclone. It has already made its mark in the handling of several different kinds of ores. In writing for our Bulletin No. 800 tell us about your anticipated requirements. We are in position to make pilot scale tests.

Feed . . . minus 250 mesh slime product from concentration; values in MnO_2 and $CaWO_3$

Separation Point . . . 15 microns

Oversize . . . to tables for further concentration

Undersize . . . to thickeners of original mill circuit which serve as a standby unit.

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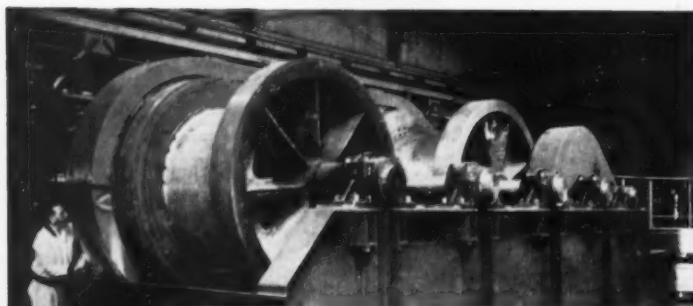
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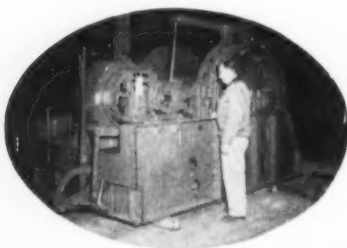
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This YUBA-built double-drum dredge hoist is designed to handle 194-foot digging ladder and is capable of lifting 800 to 1000 tons. Single-drum hoist (bottom) built by YUBA for tramway carries 5200 feet of wire rope. We're old hands at building such machinery. Every bucket ladder dredge Yuba has built combines many special "machines"—hoists, conveyors, drives, screening and metal saving equipment, winches, pumps—all designed and built by Yuba.

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Our facilities include shops for carbon and alloy steel forging, heat treating, steel fabricating, welding, pattern work, iron and bronze castings, and machine shop capable of handling single large, heavy pieces. We have long experience in properly preparing and documenting export shipments.



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BRAZIL—The Nippon Steel Tube Company, one of the largest steel companies in Japan, is reported to be considering the possibility of building a steel plant in Brazil. The president of this company, Yosaky Tanaka, is said to have contacted the Brazilian Secretary of Agriculture, Dr. Joao Cleofas, who has promised to supply all necessary information, including extent of iron ore deposits within the country.

MEXICO—Mining products exported during the first half of 1953 brought a revenue of \$49,000,000, according to the National Statistics Department. In metric tons, these were: lead, refined and impure bars, 104,432.8; copper, electrolytic and impure bars, 22,994.6; refined zinc, 27,432.9; metallic mercury, 289.2; bismuth, impure bars, 124.5; and antimony, pure and impure bars, 318.9. In 1952, the total for the entire year was as follows: lead, 205,553.7; copper, 51,775.3; bismuth, 380.6; and antimony, 968. In addition, 10,970.3 tons of fabricated iron were exported last year; none of that was exported during the first six months of 1953.

COLOMBIA—Sales of newly mined gold on the recently opened free gold market are now underway. Latest returns to gold producers have amounted to 112.00 Colombian pesos per ounce, or an equivalent of \$44.80 (United States) per ounce of fine gold in Colombian currency. Now that the local undeclared guerrilla civil war has been brought to an end by the new government, prospectors and "barreteros" are returning to the backlands with a renewed interest in gold. This is reflected by the increasing number of "prospects" seeking capital for exploration.

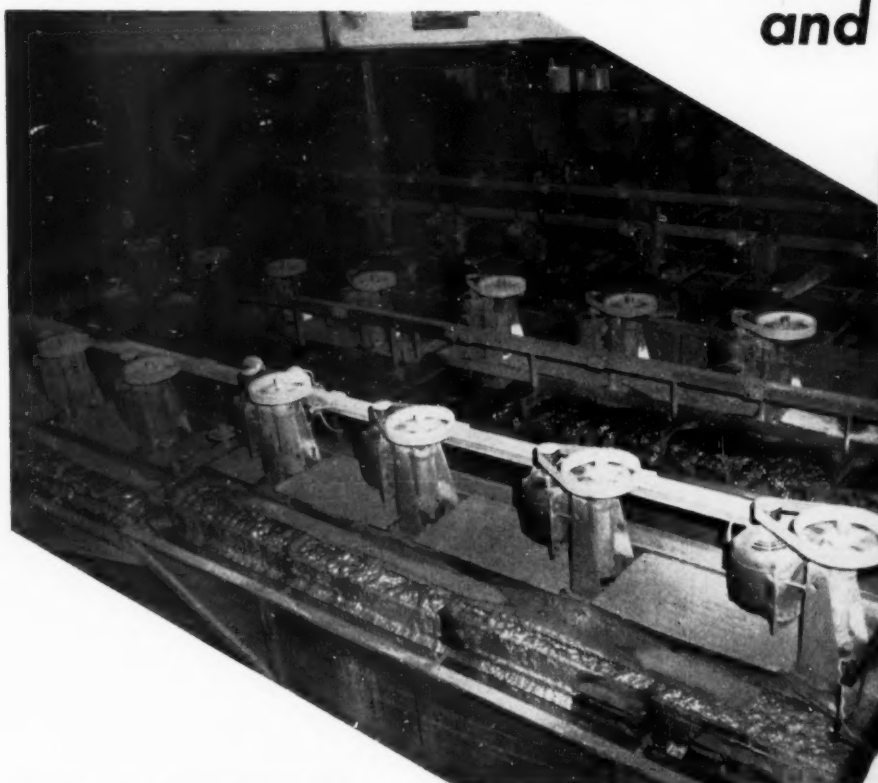
ARGENTINA—Vanadium mining is becoming more intensive in Argentina, particularly because of increasing exportation of this mineral to such countries as Brazil. There are vanadium deposits in San Luis (0.6 to 1.2 percent V_2O_5), Mendoza (3 to 7 percent V_2O_5), and Cordoba (2 to 10 percent V_2O_5).

MEXICO—Cia. Minera Azufrosa, S.A. of Cerritos, San Luis Potosi, has sold 25,000 tons of sulphur to Spain for early delivery. The consignment will be shipped from Tampico. The firm is said to be the only one in Mexico actually mining sulphur at present.

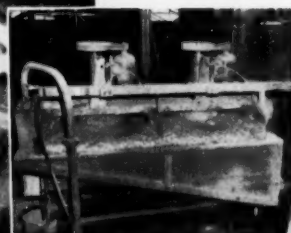
COLOMBIA—A modern 25-ton-per-day mill is to be installed on the property of Bombona gold mine owned by Jean Model. Included in the installation will be a small smelting plant to handle the refractory ores of the property and of other properties in the area. The mine is located near Tuquerres in the Department of Narino.

ARGENTINA—Development of lead ore is continuing. Stockpiled concentrates on hand are said to be enough to supply the country's domestic requirements for a year. In the zone of Calingasta in San Juan province there are three groups of mines in which veins measure close to 10 meters in width. The estimated ore reserves amount to 500,000 tons. A concentration plant will probably be installed close to the mines to treat 200 tons daily. This should also stimulate development and production. In the province of Mendoza, La Picaza mine is reported to have produced samples assaying 17.2 percent lead (average grade), in veins with an average width of 0.62 meters. This mine has a modern conveyor to transport minerals from the mine to the plant.

FAGERGRENS pay off in both ROUGHER and CLEANER Flotation



Fagergren cells in lead cleaner flotation circuit.



Fagergren cells in zinc cleaner flotation circuit.

Fagergrens used for rougher flotation by Pend Oreille Mines & Metals Co., Metalline Falls, Wash. Zinc circuit in foreground, lead circuit in center, duplicate circuits being installed in background.

HERE ARE THE RESULTS OBTAINED BY A MAJOR LEAD-ZINC PRODUCER

48 Fagergren Flotation Machines are used by Pend Oreille Mines & Metals Co. in flotation circuits having a capacity of 1600 tons per day. The ore is hard and abrasive with lead (as galena) occurring in coarse crystals and zinc (as sphalerite) finely disseminated in the gangue. Specific gravity of ore is 2.7 to 2.8.

Fagergren's highly efficient performance in this application produces superior metallurgical results, as follows:

1. Lead concentrate grade averaging well over 70% lead.
2. Zinc concentrate grade running close to 60% zinc.
3. Recoveries of approximately 95% lead and zinc in respective concentrates.
4. Exceptionally low lead and zinc tailing assays.

High Metallurgical Efficiency, as demonstrated above, is not unusual with Fagergrens. It is based on the faster rate of flotation and greater flotation recovery made possible by Fagergren's exclusive Rotor-Stator design. This superior agitating mechanism is unmatched for effective pulp circulation and aeration with resulting greater capacity per cubic foot of cell volume and higher mineral recovery.

Specify Fagergrens for your next installation or as replacements for older, less efficient machines. Send today for free copy of Fagergren descriptive bulletin and for recommendations concerning your flotation problem.

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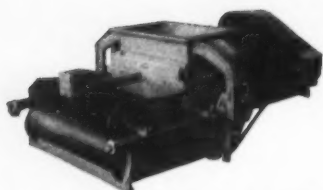
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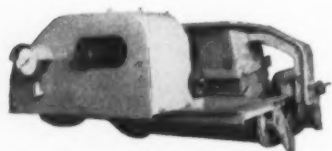
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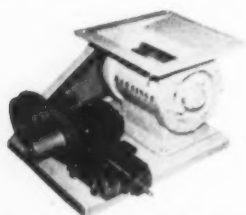
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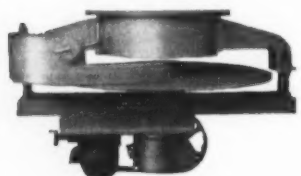
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BRAZIL—Production of silver in 1952 totalled 538,113 grams; in 1951 this production reached 631,879 grams. *St John del Rey Mining Company* in Minas Gerais state, and *Plumbum S.A.* and *Usina de Chumbo e Prata de Apiai*, both in the state of Sao Paulo, produce most of the Brazilian silver.

BOLIVIA—A new process for smelting of tin from low-grade tin ore may be the answer to Bolivia's low-grade ore situation. The process was developed in the United States under the direction of Carle R. Hayward who holds the patents, and was completed at *National Research Corporation* in Cambridge, Massachusetts. Financing of research was provided by *New Enterprises, Inc.* The vice president of the latter firm is currently discussing the application of the process with Bolivian officials. It has been suggested that a tin refining plant using this process could be set up there.

MEXICO—Failure to pay mining development taxes promptly is no valid reason for cancelling concessions for those operations, according to a recent ruling by the National Supreme Court. The Court upset a writ issued by the Ministry of National Economy against Joaquin Alarcon Navarrete, Salvador Bores Molina, and Francisco Bores Leon voiding their work franchises on Cerro Prieto, El Yunque, and El Tambor tracts at Arteaga, Michoacan. The Ministry argued that it had the legal right to cancel these concessions because the concessionaires had failed to pay taxes when due. The high court held that inasmuch as the concessionaires had their papers in order and were actually working the tracts, voiding of their franchises was an abuse of the letter of the law.

FRENCH GUIANA—A United States expedition has returned from the Sinnamary region with an excellent impression of the tantalite deposits granted to a French-American company. Some other deposits of tantalite have been found in the immediate vicinity of Cayenne. Also at Bagdad in the vicinity of Saul, deposits of columbite have been noted.

SURINAM—Exploration by the Geological and Mining Service on Nassau Mountain is reported to have indicated a reserve of about 10,000,000 tons of good grade bauxite.

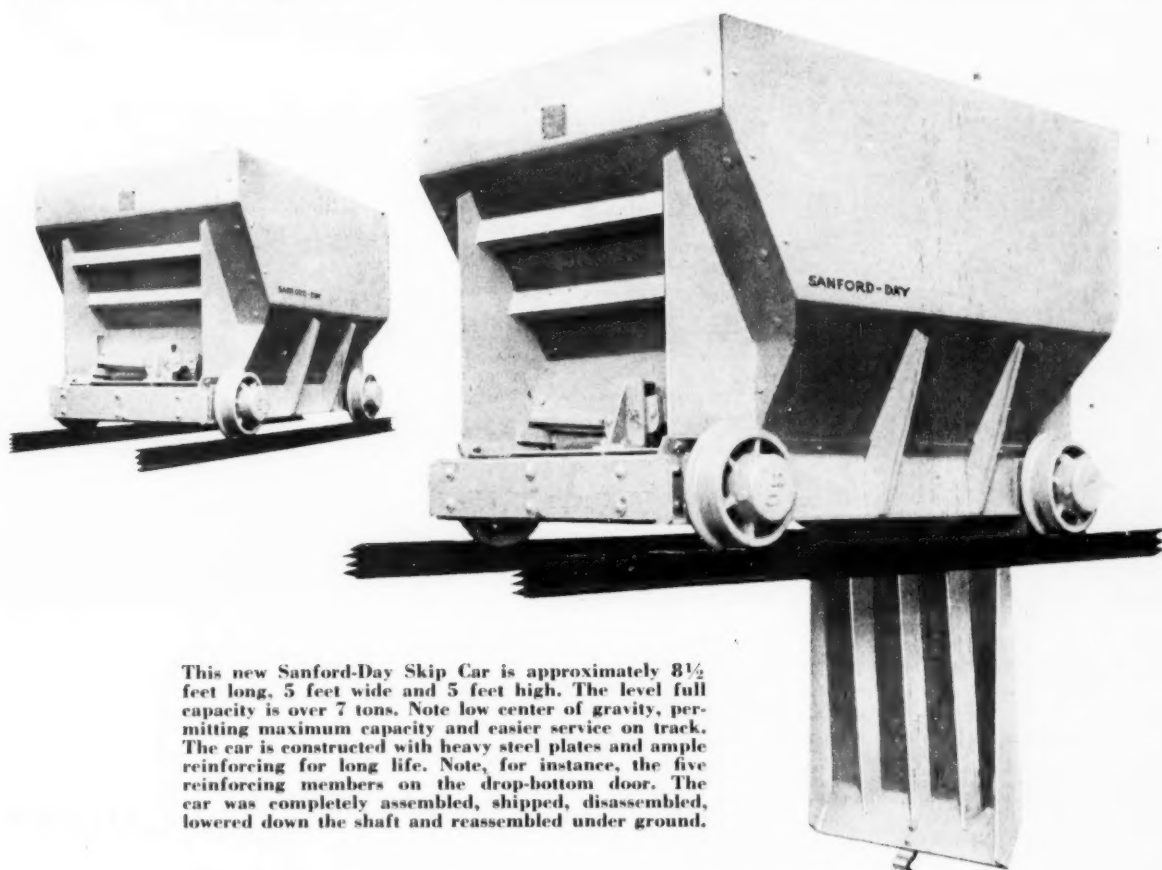


NORTH AMERICA

BRITISH COLUMBIA—*Canadian Exploration, Ltd.* at Salmo is handling 55,000 tons of ore monthly in its lead-zinc mill. Mill expansion and new mining methods have cut mining and milling costs by more than 50 percent. As of July 31, ore reserves were reported at 6,215,000 tons averaging 1.2 percent lead and 4.9 percent zinc. Tungsten ore reserves were estimated at 515,000 tons averaging 0.87 percent WO₃ or 448,640 units of WO₃.

YUKON TERRITORY — *Bellekeno Mines Limited* has made its first shipment of 800 tons of ore to the Mackenoyukeno custom mill at Keno Hill. The mill will handle a minimum of 1,500

New One-Door Bottom Dumping Skip Car Built for Development Work at Resurrection Mine



This new Sanford-Day Skip Car is approximately 8½ feet long, 5 feet wide and 5 feet high. The level full capacity is over 7 tons. Note low center of gravity, permitting maximum capacity and easier service on track. The car is constructed with heavy steel plates and ample reinforcing for long life. Note, for instance, the five reinforcing members on the drop-bottom door. The car was completely assembled, shipped, disassembled, lowered down the shaft and reassembled under ground.

To work a new development at the Resurrection Mining Co. at Leadville, Colo., a 16° winze was required for moving material to two 100-ton capacity pockets located at top and directly beneath the inclined slope.

An automatic bottom dumping car was the only practicable solution. A short car, only 8½ feet overall, was required for loading by the mucker and therefore only one bottom-dumping door could be used. In addition, the bin lengths were only 10 feet, necessitating a short car.

In collaboration with the customer's operating officials, we designed and built this one-door type

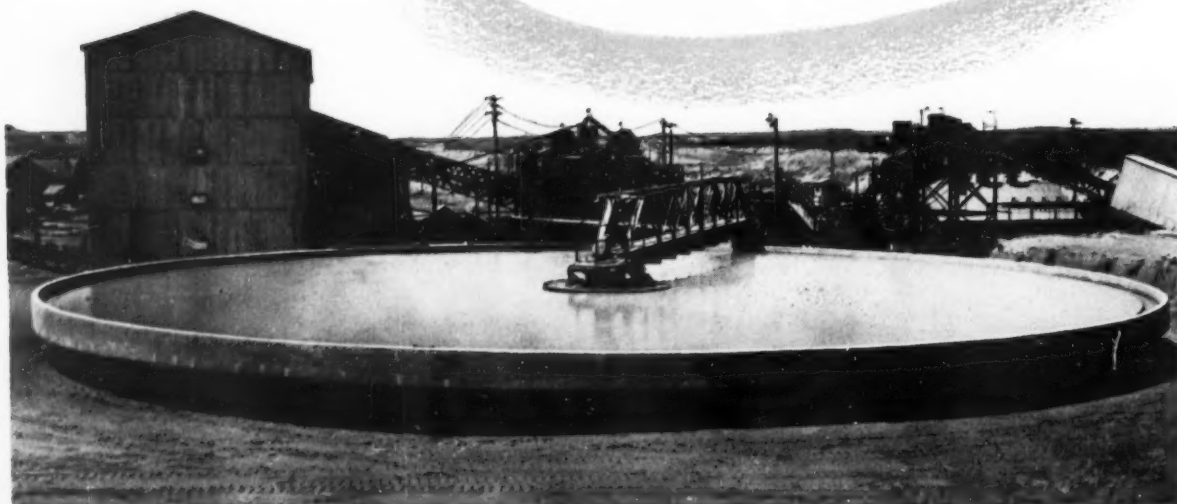
Sanford-Day Bottom Dumping Skip Car that solved the problem. The car is moved by cable and hoist, which is located about 60 feet beyond the pockets. A selective tripping device, mounted at one side of track, trips the car door at either pocket for discharging load.

We bring this new car to your attention as another example of Sanford-Day's ability and aggressiveness in solving the metal and non-metallic mine operator's many haulage problems. Regardless of what your mine car needs may be, it will pay you to let us engineer and build cars to suit your own requirements.

SANFORD-DAY Iron Works

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the DORR 4-Arm Torq Thickener



This 130' dia., heavy duty 4-Arm Dorr Torq Thickener is in operation at one of the Mesabi Range properties of Jones and Laughlin Steel Corporation. It is thickening 100 long tons per hour of minus 150 mesh iron ore tailings. Solids content in the feed averages 12% solids and Thickener underflow contains approximately 33% solids. Thickener overflow is returned to the mill water supply.

New Mesabi Range Installation Handles 100 tons per hour of Iron Ore Tailings

When your problem is to simplify the handling of heavy ore tailings, the Dorr 4-Arm Torq Thickener may be exactly the answer you need.

Two long arms rake only the outer section of the tank floor. Two short arms take over the load in the inner section, raking all solids to a conventional centercone discharge. All 4 arms are pro-

vided with the exclusive Dorr Torq feature which reduces overload by continuous raking action, without the danger of stalling and damage to the unit.

For more information about the advantage of the 4-Arm Torq and the complete Dorr Thickener line, write for a copy of Bulletin No. 3001. **THE DORR COMPANY**, Stamford, Conn. *In Canada:* 26 St. Clair Avenue, E., Toronto 5.

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INTERNATIONAL

tons of ore from Bellekeno per month from now on. The mill heads in the first shipment reportedly averaged 60 ounces silver and 12 percent lead per ton. In the mine, raising from the third level is now underway and stopes on the second level are ready for mining.

ONTARIO—Delta Development and Exploration Co., Ltd. and a subsidiary, Amcan Holdings Limited, have been formed to mine and develop properties in Canada. Delta will be concerned with development of proven mining claims, while Amcan's sole purpose will be to invest money. Exploration work on claims in Saskatchewan and New Brunswick will be undertaken first.

QUEBEC—Vendome Mines Ltd. has begun shaft sinking work at its property near Barraute. Vendome was formed earlier this year to acquire the lead-zinc properties of Mogador Mines. A three-compartment shaft will be sunk to a depth of 500 feet. Two levels will be established and about 3,000 feet of lateral development work will be undertaken by P. Harrison and Company under contract. The block of ground between the 500-foot and 1,200-foot horizons will be drilled later. Previous drilling by Mogador had indicated an estimated 750,000 tons of ore averaging 7.25 percent zinc, 0.35 percent lead, 0.45 percent copper, 0.04 ounce gold, and 2.05 ounces silver per ton between the 100-foot and 600-foot horizons.

NEW MEXICO—The newest of nine uranium recovery plants treating uranium ores from the Colorado Plateau is now being operated by the Anaconda Copper Mining Company in Bluewater, New Mexico. The new plant treats high lime ore by the caustic leach method. The plant may be expanded in the future to include a separate circuit to process sandstone type ore. Reserves of this ore are developing in the Bluewater-Grants area of New Mexico.

ONTARIO—The first shipment of 7,000 tons of iron ore formally marked the beginning of production from the Hoearth mine of Steep Rock Iron Mines Ltd. The new open-pit mine is expected to produce 2,000,000 and 2,500,000 tons annually. To date 40,000,000 cubic yards of overburden have been removed and 15,000,000 cubic yard still remain before the extent of the ore deposit is fully known. The Errington open pit will shortly be suspended for underground operations. Small tonnages of development ore are already coming from this operation and large-scale production is expected upon completion of stope development.

SASKATCHEWAN—The Potash Company of America reports that it conducted extensive drilling in the province of Saskatchewan and found potash mineralization at a minimum depth of 3,000 feet. Consideration must be given to the physical difficulties involved in shaft sinking, mining at such depth, freight, marketing, etc. Exploration work will be continued and if a commercial deposit can be developed, the firm would proceed with shaft sinking operations.

BRITISH COLUMBIA—Columbia Lead and Zinc Mines Ltd. has started operation of its tungsten mill 20 miles east of Revelstoke. Initial production rate is 75 tons a day, with plans calling for an increase to 125 tons full capacity. Some mechanical alterations may eventually be

made which would increase mill capacity to 200 tons and would allow for treatment of lead-zinc-silver-tin ores. Ore comes from the No. 9 and No. 10 levels.

ALASKA—After many years of litigation, the Harrah gold mine at Solomon is reported to be going back into production with the backing of Alaskan Associates, Inc. and Portland, Oregon interests. Recent examinations by several engineers are said to indicate that 2.5 ounces ore exist in the stopes.

ALBERTA—Two diamond drills and a company field crew of five men are working the recently acquired 16-claim Fidler property of Goldfields Uranium Mines Limited at Ray Lake. Mineralization has been identified as pitchblende. One drill will explore the radioactive structures on the western end of the property, while a second drill is working the central portion of the property. A geological mapping and line cutting program is also underway. At the company's Beaverlodge holdings in Saskatchewan, an important surface discovery has been made on Group 21 ground on the west boundary of Rix-Athabasca Uranium Mines. Traced for a length of 1000 feet, the showing has been exposed to date by four trenches along a distance of 500 feet. Some pitchblende is visible. Following trenching and surface sampling now underway, the discovery will be diamond drilled.

UTAH—Big Indian Mines, Inc., has found mineralization with composite assays of the cores from 0.13 to 0.22 per-

cent uranium oxide on its property which is three miles north of the Utex Exploration Company's multimillion dollar property in San Juan County, Utah. Bands or stringers assayed at 0.40 to 0.50 percent uranium oxide.

ONTARIO—Rare Earth Mining Corporation is conducting a 5,000-foot diamond drill program on its Tory Hill group in the Bancroft area of Monmouth Township. A scintillation counter survey is also in progress, as well as bulldozer stripping. The testing will follow up and seek extensions of indications found in previous tests conducted in 1951 and 1952. Signs of radioactive minerals were first noticed in 1948; Lead-Ura Mines was formed and it completed stripping and trenching of the property. This work showed that the minerals were uranorthorite, allanite, and zircon, occurring in narrow, parallel, vein-pegmatite bodies. The company changed its name to its present one in 1951.

BRITISH COLUMBIA—Kootenay Base Metals Ltd. has resumed milling operations at about 35 tons daily at its East Kootenay mining district property. Work is on a contract basis, company's costs ranging between \$8 and \$9 per ton. Lead and zinc concentrates are being shipped to the ASARCO smelter at East Helena, Montana.

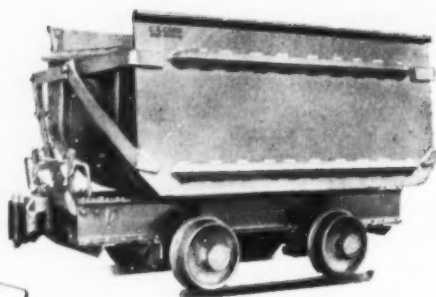
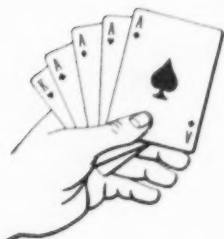
NORTHWEST TERRITORIES—Salmita Consolidated Mines Limited expects to have its 100-ton mill in operation before the end of this year at its Matthews Lake gold-tungsten property 150 miles northeast of Yellowknife. Ore for the first few months of operation will be drawn



ALASKAN GOLD PLACER OPERATIONS

Aerial view of the Miscovich Brothers' gold placer operations at Flat, Alaska. This is the site of the original gold discovery on Otter Creek in 1909. The district is noted for its coarse gold, found on a granite bedrock. Although the placer ground has been previously worked by drift mining; by Bagley scraping; and by dredging by the A. J. Reiley Investment Company with a 3-cubic-foot, connected-bucket-line dredge, the Miscovich operations are paying. One of the reasons for their success has been the digging of five or six feet of bedrock with a 1½-cubic yard backhoe and sluicing of the coarse gold from the bedrock. Shown in the picture are two D-8 Caterpillar bulldozers pushing gravel into the sluice box, a 37B 1½-yard drag-line sidereasting sluice trailing away from the end of the box, and the backhoe in operation. In the background are the surface buildings of the Golden Horn underground quartz-gold mine which is idle.

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* Reg. U. S. Patent Office

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from the first level of the mine. It is planned to crosscut 150 feet eastward from "B" vein to the "T" vein so that additional working faces may be established. To provide ore feed for the next year and one-half, the shaft will be deepened to a second level at 300 feet and the "B" and "T" veins will be opened.

ONTARIO—Preparations are underway by *Anglo Roun Mines Ltd.* to start initial exploration work on its 2080-acre property west of the *Preston East Dome Ouirke Lake* operation on the northern belt of the main uranium-bearing structure on the new Algoma uranium mining area of northern Ontario.

ALASKA—The Territorial Legislature has appropriated money for the compilation of a classified index of mineral deposits in Alaska. All information from the United States Geological Survey, U. S. Bureau of Mines, and the Territorial Department of Mines will be incorporated in the index. Each deposit will be classified according to whether it is a producing mine, a prospect on which work has been done, or merely a reported find.

BRITISH COLUMBIA—A new electric induction furnace for melting zinc sheets is now in operation at the Trail plants of the *Consolidated Mining and Smelting Company of Canada, Limited*. Designed and constructed by *Societa Italiana Costruzioni Elettrotermiche* of Milan, Italy, it is the largest of its kind in the world and the first to be used in the Western Hemisphere. Most of the zinc will come from Cominco's *Sullivan* mine and concentrator at Kimberley.

NEW MEXICO—*United States Smelting, Mining and Refining Company* has shut down its lead-zinc operations in New Mexico due to the low prices. The suspension has laid off 185 men.

ONTARIO—Some 80 claims held by six inactive gold mining companies have been acquired by *Mining Futures & Holdings Ltd.* in northern Ontario and Quebec. These companies have either exhausted their funds or have incurred debts and the properties have been in danger of being lost. In return for paying all liabilities, *Mining Futures* has acquired the assets of the *New Barber-Larder Mines*, *Tovarich-Larder Gold Mines*, *Bell River Mines*, *Trivio-Bell River Mines*, *Rhynus Ramore Mines*, and *Kenroy Malartic Mines*.



JAPAN—The Canadian firm of *Noranda Mines, Ltd.* has shipped 10,000 tons of copper ore to the *Mitsui Bussan K.K.* The ore includes 21 to 23 percent copper concentrate. A delay in negotiations with Chile for copper ore is said to have necessitated the importation from Canada.

INDIA—The uranium-thorium plant under construction at Trombay, near Bombay, is expected to be completed by the end of 1954. The land has been levelled, and the foundations started. Raw material for the operation will come from Alwaye. Because the plant will require constant observation and access to research facilities, it was decided to build the plant close to the headquarters of the Indian Atomic Energy Commission in

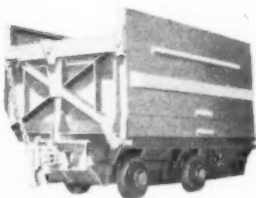
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102



LOHED MINE CARS



JETO BOTTOM DUMP SKIP



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Engineering
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stead of close to the mineral resources. Indian personnel have been specially trained to operate the plant.

PAKISTAN—An amendment has been made in the Pakistan Mining Concession Rules, 1949. The Governor-General now reserves the right to determine the case granted without any compensation being paid to the lessee, if at any time during the period of the lease he is of the opinion that mining operations under the lease tend directly or indirectly or are likely to prejudicially affect the salt mines or salt deposits in or around the area for which the lease is granted. The opinion is binding upon the lessee.

MALAYA—The low price of tin and not inefficiency of operation has been responsible for the closing down of many of the Federation's mines, reports Dato Nik Kamil, Member for Lands, Mines,

and Communications. Since the end of March when the price began to fall from the comparatively steady level of about \$470 a picul, there was a net decrease of 30 in the number of tin mines in operation. Actually, during that period 93 mines closed down because the low price made future operations unprofitable; 90 mines opened or reopened; 27 other mines were closed down after working out their available ground. There are now three less dredges in operation and 60 less gravel pump mines, but there has been an increase of 33 mines operating under other categories, mainly small-scale sluicing operations at or near mines which had closed.

JAPAN—The Mitsubishi Metal Mining & Smelting Company has made two recent agreements with the British Metro Corporation to supply Australian lead

concentrate to Japanese smelting companies. The most recent contract was for 2,000 tons of lead concentrate. Under a barter agreement with Argentina, Japan will shortly export 2,000 tons of electrolytic copper in exchange for 7,000 bales of Argentine raw wool. In a separate arrangement, Japan expects to ship 120,000 to 130,000 tons of iron and steel valued at \$20,000,000 to Argentina in exchange for wheat and wool.

THAILAND—Tromal Prospecting Company Ltd. has purchased a 5,000-ton ship which is being equipped with grabs and a beneficiation plant in Penang. The grab dredge is designed to work the company's newly acquired property in the sea near Bhuket Island off the southern part of Thailand.

INDIA—Exploration of pyrite deposits at Amjor in the Shahabad district of Bihar by the mining section of the Geological Survey has indicated that the area may possibly become a substantial sulphur producer. The Geological Survey took over the exploration work in the Amjor area about two years ago after a private firm had done some prospecting work. The deposits appear to be extensive. India imports about 52,000 tons of sulphur annually because there is very little sulphur production within the country.

MALAYA—Prolonged delays in granting of tin prospecting licenses and mining leases, lack of a uniform land policy, and the export tin duty, are cited by many of the Malayan tin mining industry's leaders as discouraging the location and development of low-grade reserves. Different states within the Federation set different conditions for leasing; applications for leases are often held up for two years or more. Many tin experts believe that the latter delays are caused by administrative mix-up—the state government grants the leases but gets little financial return from the mining, while the federal government takes most of the taxes but has no control over the granting of leases.

PAKISTAN—A team of experts from the German steel firm of Krupp has arrived in Karachi to survey and prospect the iron ore deposits of the country. They plan to investigate the Mianwali district, the Attock and Sargodha districts, and Chitral and Mardan in the Frontier Province. Krupp signed an agreement with the Pakistan Industrial Development Corporation which appointed Krupp as technical consultant for ten years. A survey made by the German firm of Dmugs last year revealed that iron ore deposits in Attock, Mianwali, and Sargodha districts have an iron content of about 45 percent, and the deposits in Chitral a remarkably high content of 64 percent. About 12,000,000 tons were estimated by the first survey to be in reserve. Plans are also being made for construction of a steel plant which would produce 300,000 tons annually.

THAILAND—The recent sharp drop in tin prices caused much concern in mining centers in Thailand. Over 20 gravel-pump mines in Bhuket, Takuapa, and Pangnga were closed down. In addition, Krasom Tin Dredging Ltd. stopped operations of its dredge in Pangnga. Representatives of the Thai Mining Association have asked the government to reduce the present Royalty rate of about 27 percent and to reduce other taxes.

JAPAN—During 1952, Japan produced about 47,000 long tons of chrome ore most of which was low grade containing about 34 percent Cr_2O_3 . About 11,000 additional tons were imported to meet

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NOVEMBER, 1953

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the country's total domestic requirements. Totori Prefecture supplies most of the chrome ore mined in Japan.

MALAYA—The mine in Pahang owned by *Murai Tin Ltd.* remained closed throughout last year because of the unsatisfactory security position, and remained evacuated by government order. Accounts for the year ended June 30, 1953 showed a loss of \$533. The company's financial resources, including the provisional restoration award for war damage compensation, are considered insufficient to allow for adequate restoration of the mine at present day costs.

TURKEY—Metal output is considered to be on the increase with the addition of modern installations. Copper output,

which totaled 17,000 tons in 1951, is expected to amount to 23,000 tons this year, and about 26,000 tons in 1954. After modernization is completed at the *Dicrik* and *Karabuk* iron ore mines (about 1955), annual production is expected to be about 450,000 tons. Output from these mines was about 220,000 tons in 1951 and will be about 350,000 tons this year. A new plant at *Karabuk* will raise steel output to 250,000 tons from 140,000 tons in 1952 and 165,000 tons in 1953. Chrome production is expected to increase from 160,000 tons in 1950 to 180,000 tons in 1953.

INDIA—A prolonged strike which ended in June is expected to be reflected in the annual production of *Indian Copper Corporation Ltd.* for this year. Total

output is expected to be not over 4,000 long tons, since only 1,267 long tons were produced during the first half of the year. Average output per quarter in 1952 was about 1,530 long tons; 1,770.75 long tons in 1951, and 1,653.5 long tons in 1950.

THAILAND—The government has announced that lignite mining both at Krabi and Manoh will be controlled by the newly established Lignite Organization. The Royal State Railway has been requested to convert all wood-burning locomotives for lignite consumption within the next five years.

INDIA—Uranium deposits are reported to have been located in one district of Bihar and are being explored.

MALAYA—Five aluminum refining experts from Japan are touring Malayan bauxite mines for the first time since the war. Their most important stop will be at Johore where bauxite production is currently being increased. The Japanese represent the *Japan Light Metal Company*, the *Sumitomo Chemical Company*, *Light Metal Refiners Associated*, and others.

JAPAN—The Japanese steel industry may not be able to compete in the world market because the cost of raw materials is now averaging over 75 percent of the cost of the steel, according to William S. Vaughn who is assistant to the president and technical advisor to the *Fuji Iron and Steel Company* of Tokyo. He reports that Japan imports about 5,000,000 of the 6,500,000 to 7,000,000 tons of iron ore it consumes annually. About 3,500,000 tons of coke and coal are reported per year. Thus, pig iron costs about \$72.00 per ton, compared with \$50.00 a ton in the United States and only \$30.00 a ton in India.

MALAYA—The *Sungei Way Tin Dredging Company* has spent \$115,000 to rebuild a part of the Klang Road which had passed over valuable tin-bearing ground. At present, the dredge is working parallel with the road and is not expected to reach the newly opened area for another five years.

INDIA—Two German firms, *Demag and Krupp*, are reported to have signed an agreement with the Indian government to build a new steel plant there. The plant will cost \$150,000,000, of which the German firms will contribute \$20,000,000. India will be the main participant but after the company is formed the International Bank for Reconstruction and Development reportedly will be asked to cooperate. The project, an important part of India's five-year plan, will take about four years to complete.

MALAYA—*Renong Tin Dredging Company, Ltd.* and *Straits Tin Fields Ltd.* have agreed on the joint operation of a tin-bearing property at Jinjang near Kuala Lumpur. *Renong's* *Gombak* dredge will be dismantled and reconstructed on the property. The company's No. 2 dredge at Razar will remain in operation independently.

THAILAND—*Bangrin Tin Dredging Company Ltd.*, which is being taken over by *Siamese Tin Syndicate*, moved its No. 2 dredge from Thailand to Chemor in Perak, Malaya, where it was planned to be worked as a joint venture of the two companies. Unfortunately, uneven limestone bottom was encountered where none had been disclosed by test boring, and because of bandit activity no proper close boring has been possible. The dredge remains dismantled, therefore, and under care and maintenance at Chemor.

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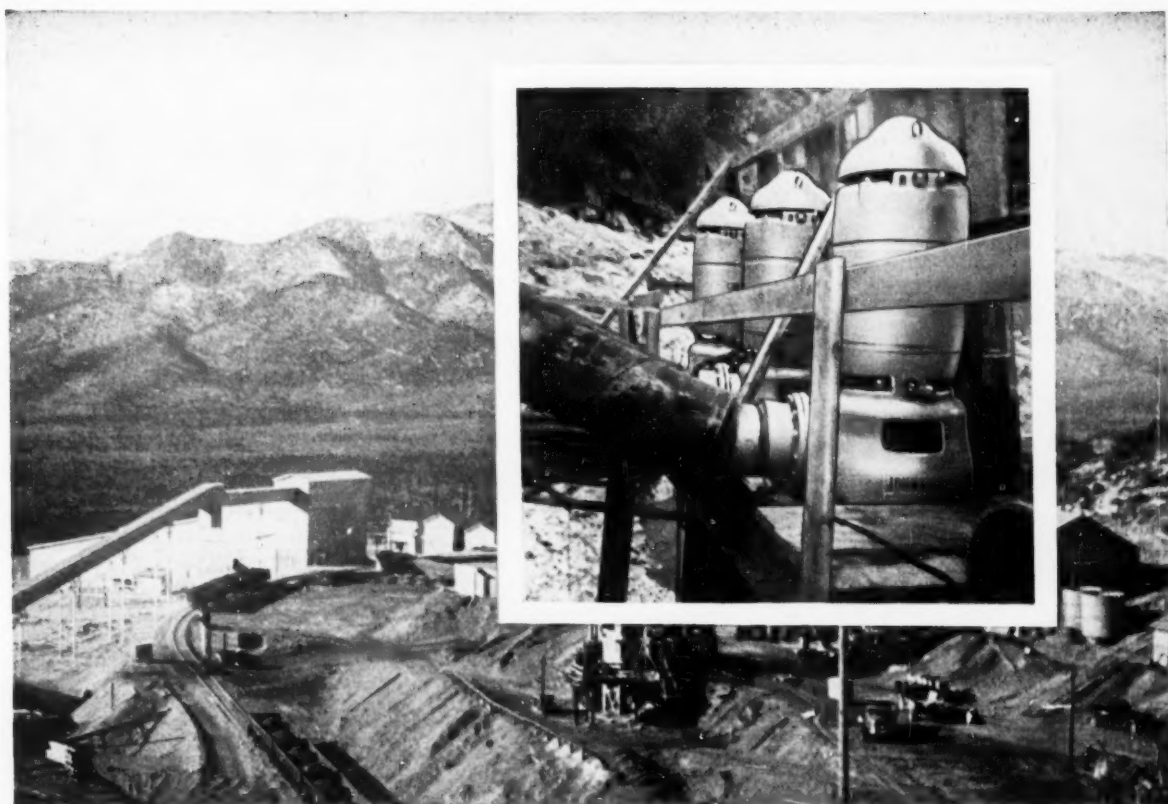


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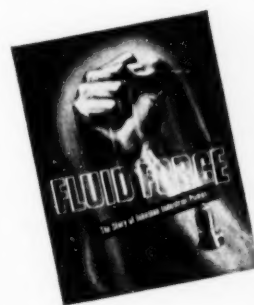
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NOVEMBER, 1953

[World Mining Section—67]

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U.S.A. Metal & Mineral Prices

METALS

October 19, 1953

COPPER:	Electrolytic, Delivered F.o.b. cars, Valley basis	29.00-30.00e
	Lake, Delivered, destination U.S.A.	30.125e
	Foreign Copper, Valley basis	29.00-30.00e
LEAD:	Common Grade, New York	15.90e
	Tri-State Concentrates, jig, flotation 80% lead, per ton	\$166.50
ZINC:	Prime Western; F.o.b., E. St. Louis	10.00e
	Prime Western; Delivered, New York	10.50e
	Tri-State Concentrate, 60% zinc, per ton	\$56.00
	Primary 30 Pound Ingots (90%+) plus). F.o.b. shipping points	21.50e
ALUMINUM:	Lone Star Brand, F.o.b. Laredo, in bulk	35.00e
ANTIMONY:	(in ton lots) price per pound	\$2.25
BISMUTH:	Sticks and bars, 1 to 5 ton lots (Price per pound)	\$2.40
CADMIUM:	97-99%, keg of 550 pounds (Price per pound)	\$2.40
COBALT:	Powder	Nom., per pound
COLUMBIUM:	Ingots (99.8%), F.o.b. Freeport, Texas	27.00e
MAGNESIUM:	Flasks, Small lots, New York	\$185.00-\$187.00
MERCURY:	"F" Ingots (5 pounds), F.o.b. refinery, Port Colborne, Ontario	60.00e
NICKEL:	Grade A Brands, New York (Price per pound) Prompt delivery	79.00e
TIN:	99.3% + (Price per pound)	\$5.00
TITANIUM:	United States Treasury price	\$35.00 per ounce
GOLD:	Newly mined domestic, United States Treasury price	90 1/2e per ounce
SILVER:	Foreign Handy & Harman	85.25e per ounce
PLATINUM:	\$91.00-\$93.00
ZIRCONIUM:	Powder, 100 pound lots, per pound	\$7.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	10 to 12% BeO, F.o.b. mine, Colorado	\$45.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at \$400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, \$40 per unit; 9.0 to 9.9%, \$45; over 10.0%, \$50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian), 48% Cr ₂ O ₃ , 3 to 1 Ratio	\$44.00-\$46.00
	African (Transvaal), 48% Cr ₂ O ₃ , No Ratio	\$34.00-\$35.00
	Turkish, 48% Cr ₂ O ₃ , 3 to 1 chrome-iron ratio	\$54.00-\$56.00
	U. S. Government are purchase depot Grants Pass, Oregon, Base price, lumpy ore, \$115.00; fines and concentrates \$110.00 for 48% Cr ₂ O ₃ and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr ₂ O ₃ .	
COLUMBIUM-IRON ORE:	At United States small lot beryl purchase depots. \$3.40 per pound contained combined pentoxides in 50% ore.	
	Lake Superior, Per gross ton Lower Lake Ports	\$9.90
	Mesabi, Non Bessemer, 31.5% Fe. Second quarter	\$10.05
	Mesabi, Bessemer, 31.5% Fe. Second quarter	\$10.15
	Old Range Non Bessemer. Second quarter	\$10.30
	Old Range Bessemer. Second quarter	\$20.00e
	Swedish, Atlantic Ports, 60 to 68% Fe. Contracts, Per Unit	\$1.15-\$1.17
	Metallurgical grade, 46 to 48% Mn. Long ton unit	\$70.00
MANGANESE ORE:	Chemical grade, 80% MnO ₂ , Per ton	
	Domestic U. S. Government are purchasing depots: Deming, New Mexico; base price \$2.30 per long dry ton unit of recoverable manganese less handling and treatment costs. Wenden, Arizona; base price of \$8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of \$4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of \$6.43 per long dry ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) \$2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS ₂ , F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	\$1.00
TUNGSTEN CONCENTRATE:	Domestic, 60% WO ₃ , Per short ton unit	\$65.00
URANIUM ORE:	Foreign, 65% WO ₃ , Per short ton unit	\$50.00
	Carnotite-Resacelite, F.o.b. purchase depot plus \$0.06 per ton mile (\$6.00 maximum), Grand Junction, Rifle, Durango, Naturita, and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico, Edgemont, S. Dakota. Base price of 0.10% are \$1.50 per pound and up to \$3.50 per pound of contained U ₃ O ₈ plus \$0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of \$0.25 per pound for each in excess of 10 pounds. A \$0.50 per pound development allowance paid on all ores purchased. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	Carnotite-Resacelite, V ₂ O ₅ in ratio of more than 10 parts to 1 part of U ₃ O ₈ are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock.	Per Pound V ₂ O ₅ , \$0.31

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BENTONITE:	Minus-200-mesh, F.o.b. Wyoming points. Per ton in carload lots	\$12.50
	Oil Well grade, Packed in 100 pound paper bags	\$14.00
FLUORSPAR:	Metallurgical grade, 70% effective CaF ₂ content per short ton F.o.b. Illinois-Kentucky mines	\$42.50
	Mexican, 70% f.o.b. border	\$30.00
	Acid Grade, 97% CaF ₂ f.o.b. Kentucky, Illinois, Colorado	\$60.00
PERLITE:	Crude: F.o.b. mine per short ton	\$3.00 to \$5.00
	Plaster grades. Crushed and sized. F.o.b. plants	\$7.00 to \$9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	\$25.50
	Export	\$30.50

LONDON METAL AND MINERAL PRICES

October 19, 1953
Per Long Ton USA Equivalent cents per pound¹

COPPER:	Electrolytic, spot	£235 0d 0s	29.37e
LEAD:	Refined, 99.97%	£91 10d 0s	11.44e
ZINC:	Virgin, 98%	£73 0d 0s	9.12e
ALUMINUM:	Instot, 99.5%	£150 0s 0d	18.75e
ANTIMONY:	Regulus, 99.6%	£237 10s 0d	29.69e
TIN:	Standard 99.75%	£607 10d 0s	75.93e
TUNGSTEN:	Long ton unit, 297s 6d, equivalent to		\$41.66 per unit

1. With Sterling pound at \$2.80.

Quotations on metals and certain ores through the courtesy of American Metal Market, New York, N.Y.

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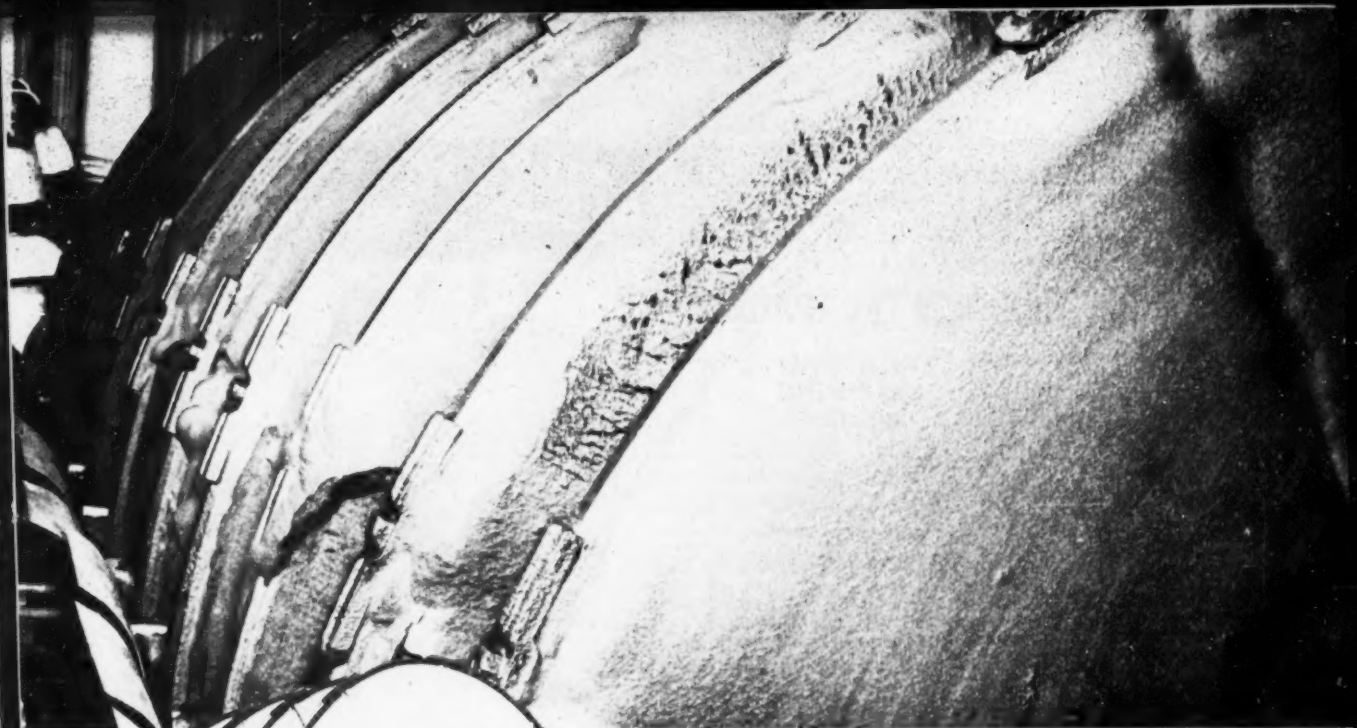
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Mining Industry

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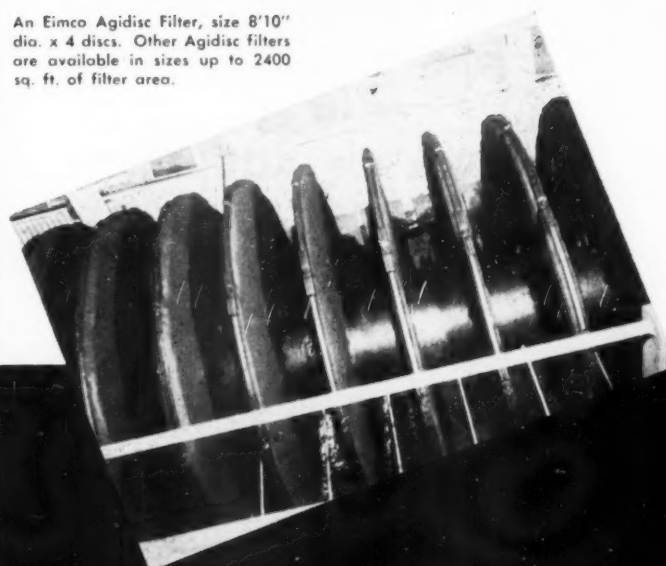
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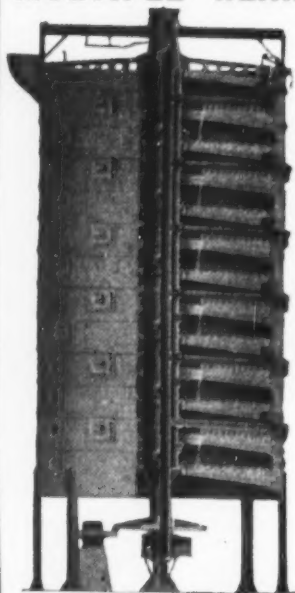
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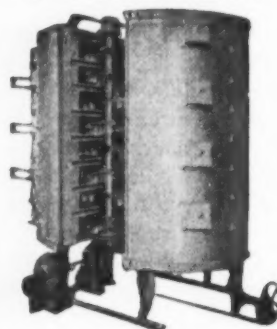
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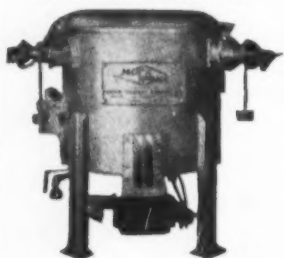
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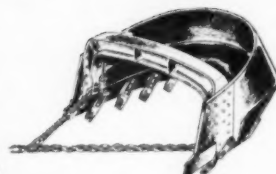
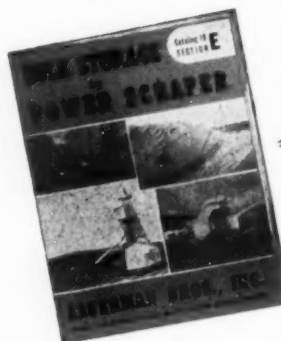
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PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

New Conveyor Belt Sheds, Retains Water

A rubber conveyor belt made with a surface that sheds or retains water is now helping in the production of taconite, a valuable source of iron ore. The belt automatically dewateres finely ground taconite as it conveys the wet material from storage tanks for processing. A simple adjustment makes the belt retain water with equal ease. Called Riffle Grip, the belt is made by the B. F. Goodrich Company.

According to Clyde O. DeLong, president of Goodrich's Industrial Products Division, the secret of the belt's dual performance lies in its unique cover design.

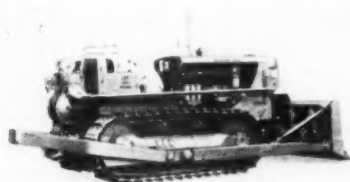


Molded rubber ridges which stand one-eighth inch high are formed in a continuous series of chevron patterns spaced several inches apart.

Operating on a predetermined conveyor incline angle, with belt idlers also placed at a specified angle, the chevron-like ridges channel water to the edges of the belt where it flows off. The material conveyed rests in the center of the belt and makes the trip free of water. Circle no. 71.

Pusher Tractor Designed For Tandem Operation

A D8 pusher tractor, adapted and equipped specifically for pusher loading work, has been announced by Caterpillar Tractor Company. According to W. S. Zeigler, manager of domestic sales, the new machine is a modified version of the Cat D8 tractor and the complete pusher package has been developed to meet an



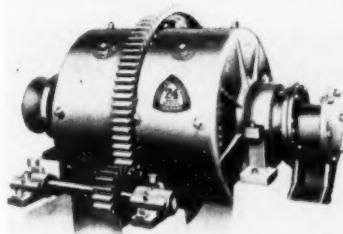
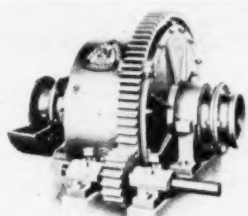
extensive customer demand for a tractor capable of heap-leading large scrapers.

One of the outstanding features of the new pusher is the tandem pusher frame attachment, developed after careful observation of earthmoving contractors who use pusher tractors in tandem for difficult loading conditions. By permitting the transfer of power from one tractor to another through the track roller frame, the highly destructive stresses imposed on the lead tractor's final drive is avoided. Circle no. 69.

IT'S NEW (No.) CIRCLE IT

New Economy Ball Mill Has Left or Right Drive

Denver Equipment Company has announced production of a new 30-inch economy ball mill. The standard mill has an alloy iron shell, hard iron liners, cast



tooth gear, drum or reversible scoop feeder with decolloy (a hard nickel-iron alloy) wearing lip, and steel cast tooth pinion gear.

Shell and head liners of any material such as manganese steel or decolloy are available. The 30- by 18-inch mill can be made into a 30- by 36-inch mill with interchangeable liners, lifter bars and end liners. And either right hand or left hand drives may be supplied as specified. The top illustration shows a right hand mill and the bottom a left hand mill. For additional data, circle no. 63.

Alloy Steel Lowboy Affords Bigger Payloads

Martin Machine Corp. has included in their line of heavy duty trailers, the Model 144TL alloy steel trailer. Built throughout with high strength alloy steel, the trailer weighs less than 8,000 pounds, yet has a payload capacity of 27 tons.

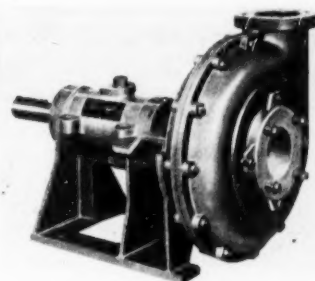
The trailer was primarily designed to haul equipment in the Caterpillar D8 weight class, and still remain within legal axle load limits in most states. High strength alloy steel has reduced dead weight to a minimum, yet the frame,



fabricated of structural members, is electrically welded into a unit of immense strength. Circle No. 67.

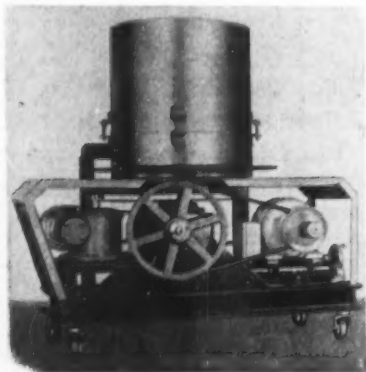
Pump Operates With No Sealing Water

For pumping abrasive or corrosive solutions that must be delivered undiluted, the Allen-Sherman-Hoff Pump Co. offers the Centrisal Pump designed to operate entirely without sealing water. Besides meeting this pulp restriction in mining fields, the Centrisal is the A-S-H substitute for the Hydrosal Pump wherever sealing water is unavailable. Like the Hydrosal, its pumping parts are protected by moulded Maximix rubber. For pumping acids, the stuffing box, packing gland and shaft sleeve are tailor-made of properly resistant alloys. The mechanical parts of the Centrisal are interchangeable with those of the anti-friction-bearing type of Hydrosal Pumps. Circle no. 74.



Testing Service For Filter-Cake Feeders

The Pulva Corporation, manufacturers of the Com-Bin feeders used to move filter cake, centrifuge cake, or dry solids which tend to arch in conventional surge bins or storage hoppers, have small rental units available to enable operators to test the efficiency of the Com-Bin feeding methods in their own plants on their own products.



The rental units are shipped in special packing cases that eliminate any necessity for crating on the part of the user. The company, however still maintains its policy of free testing service in their own testing laboratories. The rental units have been made available to give plant managers a chance to check performance of Com-Bin feeders in their mill circuits. For complete information on these rental units, circle no. 58.

Mining Tool Catalog Shows Nine New Styles

Nine new styles of carbide tipped mining tools are featured in a new mining tool catalog just released by the Vascology-Ramet Corporation. Featured in the catalog are a complete line of auger drill bits including two new styles which drill faster and more economically, clean the holes better, while making coarser realization with less fines.

These carbide tipped auger drill bits are available in sizes from 1½-inch diameter through 3-inch diameter with both square or hexagon shanks. The original V-R design roof drill is illustrated plus a new style split type which has wide application in any roof bolting program. Finger bits are also included with the addition of two more styles that have not previously been available. Circle no. 62.

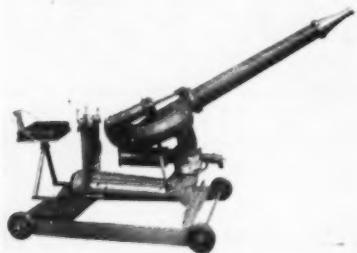
Sintering Machinery Co. Announces New Sales Reps.

Transportometer Division of the Sintering Machinery Corporation, manufacturers of continuous weighing equipment, has announced the following additional sales representatives: Tate & Roe Company, 5542 Dyer Street, Dallas, Texas, for the territory including Texas, Oklahoma and Northwest Louisiana; Supply Division, Lake Shore Engineering Company, Iron Mountain, Michigan, for the territory including Iron Range portions of

Minnesota and Wisconsin and Michigan's northern peninsula; The Galigher Company, Salt Lake City 4, Utah, for the territory including Utah and neighboring areas in Nevada, Idaho, Montana and Wyoming.

Ingenious Monitor Makes Hydraulicking Automatic

Illustrated is the latest model of the Miscovich Intelligiant where the operator controls two levers to give the vertical and horizontal traverse of the issuing water stream. Two valves control speed of piston travel by the change in volume.

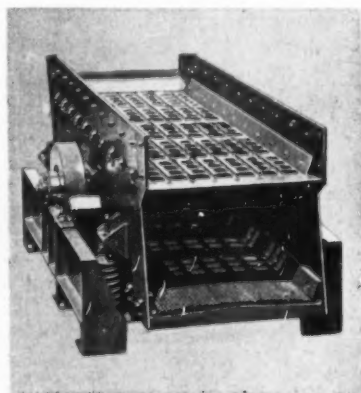


Pressure for operating the unit comes from the water stream. An enclosed oil hydraulic system controls the giant where dirty water is encountered. Another model of the Intelligiant is available that offers fully automatic operation. Any predetermined pattern can be maintained without operator attention. Circle no. 61.

IT'S FREE (No. 61) CIRCLE IT

Screens Designed For Greater Durability

Redesigned to give heavier service, more efficient operation and greater durability, the Mesabi type vibrating screens built by Pioneer Engineering Works, Inc., Division of Poor and Company, are now available in single deck (for scalping) and 2-deck (for scalping or sizing).



In the 2-deck scalping screen, the top deck is ½-inch punched plate and the bottom deck is wire mesh. The single-deck scalping screen has a ¾-inch punched

plate. In the 2-deck sizing screen, both decks are wire mesh.

The main frame on all the 4-foot screens has been redesigned to include an 18-inch car channel reinforced with 8-inch cross beams while the 5-foot and 6-foot screens have been redesigned to include 18-inch I-beams reinforced with 8-inch cross beams. The new design makes the main frame unusually strong. Vibration has been reduced to a minimum without sacrifice of action of the screen pan. Circle no. 72.

New Model Pneumatic Timber Saw Announced

Production of the greatly improved new model AS-221 pneumatic Wright saw has been announced by the Wright Power Saw and Tool Corporation. Introduced three years ago, the pneumatic Wright saw, employing the exclusive reciprocating double sawblade principle, has earned worldwide acceptance by



mine operators as the best wood-cutting air saw available.

Distinguished by the utmost in dependability, new heavy-duty construction, new easy-grip control handle, and new Sabre sawblades, this new model will cut in the hardest-to-get-at places, saw a smooth finish along a chalkline, crosscut, rip, or angle through an 18-inch timber, and saw circles with a 12-inch radius. Other new features of the model include hard chrome-plated cylinder, extra rugged locked-in pinion shaft, oversize bearings, and stronger, easier-to-sharpen sawblades. Performance of the Wright saw is characterized by faster cutting speeds, extended trouble free operation, and low maintenance costs. Circle no. 73.

A-C Releases Motor Starters Bulletin

Features of Allis-Chalmers type H starters built to control squirrel-cage, synchronous, wound motor and multi-speed motors in ratings from 2200 to 5000 volts are described in a new 12 page bulletin. Protection features of the starters; short circuit, overload, time relay undervoltage, and pullout protection are covered in addition to schematic wiring diagrams showing typical methods of control. Receive Bulletin 14B6410B by circling No. 64.

ELEVATOR BUCKET BOOKLET: Link-Belt Company has just released a 12-page book No. 2465 on its complete line of cast malleable and Promal elevator buckets. Detailed information is provided on the mounting of buckets on belts and chains, with tables and diagrams on bucket punching. Circle no. 26.

CUT COST WITH CAT WAGONS: A new booklet by Caterpillar will be of interest to those whose prime concern is the cost of ore transport on high capacity, long haul, high speed operations. Circle no. 28.

SAND DUMP BROCHURE: Telluride Iron Works is introducing a newly-designed vertical centrifugal sand pump for mill operation. It features simplicity of construction, easily replaced wearing parts, light weight, and efficiency. An engineering file brochure on the TIW sand pump is available. Circle no. 30.

HI-TEMPERATURE LUBRICANT: Designed around an unusually heavy base oil and an improved lithium stearate, D-A Lithium, Extra-Heavy lubricant combines superior wear resistance with the ability to perform efficiently at extreme temperatures. Specific information on the new lubricant may be obtained by circling no. 31.

PORTABLE COMPRESSORS: Worthington Corporation has announced a new bulletin covering their line of portable "Blue Brute" air compressors, ranging in capacity from 30 to 600 cubic feet. All models are two-stage, air-cooled units and are either gasoline or Diesel engine driven. Circle no. 32.

TRANS-VISION BOOK ON POWER SHOVELS: To graphically illustrate the "packaged assembly" features of the Lorain TL series power shovels, the Thew Shovel Company has published an 8-page "Trans-Vision" book consisting of rotogravure printing on transparent acetate film so that the various assemblies in the machine can be superimposed on each other just as they are in the actual machine. For your copy, circle no. 34.

ELIMINATE AIR TOOL WEAR: Wear and breakdown resulting from faulty lubrication can be eliminated with the new Wright air line oiler. Especially de-

signed to meet all air tool lubrication requirements, the new oiler, they say, always works, never clogs, and operates in all positions. In addition, its oil metering valve cannot vibrate shut. To get further information, circle no. 35.

HARD-FACING GUIDEBOOK IN SPANOL: The Stooddy Company have translated their famous hard-facing guidebook into Spanish for the many Latin America users of Stooddy products. The book describes and illustrates more than one hundred of the ordinary uses of hard-facing alloys in the maintenance of heavy equipment. Circle no. 36.

KYANITE FLOTATION INFO: The recovery of kyanite by flotation at Commercialores, Inc. near Clover, South Carolina is described in detail in a new bulletin by S. J. Beers, manager of Commercialores, and H. W. Harrah, metallurgical engineer for the Denver Equipment Company. Also presented is the geology and mine operation at Commercialores. For a copy of this booklet, circle no. 37.

THE WORD ON V-BELTS: A new 52-page technical manual comprehensively covering all elements of v-belt drives, complete with tables, graphs, and diagrams, is being offered by the Boston Woven Hose and Rubber Company. Circle no. 38.

OXYGEN IN COMBUSTION PROCESSES: A new bulletin available through Arnold O. Beckman, Inc. illustrates and explains how too much or too little air can have costly effects in combustion processes. It points out that by using oxygen itself as the criterion to proper combustion, greater overall process efficiency and more profits can be realized. Circle no. 39.

PLASTIC PIPE: An 8-page bulletin describes several grades of Yardley Plastic pipe for a variety of uses in mines, mills, and smelters. It is corrosion resistant, water- and air-tight, and in some sizes is rated for bursting pressures to 480 psi and working pressures to 160 psi. Applications include electrical conduit, powder-tamping sticks, and for carrying compressed air, water, slurries, and chemical solutions. Circle no. 40.

CENTRIFUGAL PUMP BULLETIN: Ingersoll-Rand has recently published a new 18-page bulletin on the class CNTA multi-stage centrifugal pumps. It incorporates sectional drawings, installation views and a 2-page chart showing the unusual amount of interchangeability of parts throughout the CNTA line. Circle no. 41.

AIR TOOL CATALOG: The Thor Power Tool Company has published a new 12-page catalog with complete illustrations, descriptions, and specifications on the Thor No. 2 series of light-weight, air-operated drills, grinders, screwdrivers, and nut setters. The No. 2 series now has a total of more than 100 separate tools. Circle no. 42.

MULTI-UNIT CYCLONES: The Dorr Company has a new 10-page bulletin on the TM Dorr-Clone. It describes in detail the physical appearance, applications, advantages, and action of this multiple-unit type liquid cyclone, citing too, actual operating data obtained from initial tests and installations. Circle no. 43.

MILLISECOND IMPROVED: Through the Atlas Powder Company, full information is available on a new blasting method which uses charges of low and high velocity explosives in alternate holes, in conjunction with millisecond delay detonators. Circle no. 44.

LEAFLET ON ZINC ROASTING: A new four page Dorr Company leaflet covers briefly the application of Fluo-Solids to the roasting of zinc concentrates—which has been thoroughly demonstrated on a commercial scale. For information on obtaining improved leaching extraction and better zinc retort production, get Dorrco's new bulletin. Circle no. 45.

CUT DRILLING COSTS: In exploration, development, or production, reduce drilling costs with the unitized BHD "Air Blast" Portadrill manufactured by the Winter-Weiss Company. Truck-mounted and with a depth capacity of 2,000 feet, the Portadrill gives higher drilling speeds, more accurate samples, cleaner hole, and faster set-ups and moves. Receive complete information by circling no. 14.

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MONITOR WITH A BRAIN: Two models of the new Miscovich Intelligent are now available. One of these hydraulic monitors is automatic and can be set to operate in any desired predetermined pattern without continuous operator attention; the other is semi-automatic and can be controlled by two small levers. Both receive motive power from the issuing stream of water. For further information on this, the latest development in modern hydraulic mining, circle no. 20.

EXPLOSIVES FACT BOOK: A new 48-page book and catalogue published by the Atlas Powder Company covers over 150 explosives and accessories and details specific aid in the selection of industrial explosives for underground and surface mining. Circle no. 21.

VERSATILITY IN V-BELTS: The Flexible Steel Lacing Company is introducing completely-integrated kits to enable the user of v-belts to make any length of belt needed. The units consist of open-end belting, fasteners, and tools. The kits are designed to furnish emergency belts and belts of lengths not available. For further details, circle no. 22.

MINE SURVEY TAPES: The new Lufkin "Lucas" mine tapes are available in two widths— $\frac{1}{8}$ -inch and $\frac{1}{4}$ -inch—and a variety of styles and graduations. A special five-arm reel that insures even reeling without binding or overlapping has been made a standard accessory with these new tapes. Circle no. 23.

CONVEYOR MOVIE: "Conveyors Only Look Alike" is the title of a new 16-mm sound film in color describing Barber-Greene's complete line of portable belt conveyors. For information on obtaining this new movie, circle no. 25.

BEST SUITED FILTER MEDIA FOR YOUR JOB: The National Filter Media Corporation offers filter media woven from Nylon, Orlon, Vinvon N, Saran, Glass, Dynel, Vincel and Cotton. This assures your obtaining the greatest degree of chemical resistance and best all around performance for your particular operation. For more information circle no. 1.

DOUBLE WEAR LIFE ON CHAINS AND CLUTCHES: The new Model HUD disconnecting hydraulic power take-off

reduces impact shocks 70%. Many drilling rigs are now drilling deeper and cheaper with the new Model HUD offered by Twin Disc Clutch Company. For complete information circle no. 2.

NEW "THRIFTY HAULER" BATTERY: The new Exide-Ironclad battery, manufactured by the Electric Storage Battery Company offers 20% more capacity at lower cost and longer life. More facts are yours by circling no. 3.

BIN STUCK LATELY? Just use a Cleveland vibrator to stop sticking. The Cleveland Vibrator Company offers air cushioned quiet types and standard metallic impact vibrators. Receive their catalogues by circling no. 4.

IRON ORE HEAVY MEDIA CONCENTRATION: Simplicity Engineering Company screening equipment handles all types of preparation work from coarse scalping to fine screening and dewatering and gives fast accurate sizing with low production costs. For full information circle no. 5.

LOWER COST PER FOOT: Diamond drill bits of all kinds are offered by J. K. Smit & Sons, Incorporated. Through longer wear, rapid penetration and high diamond recovery you will gain lower costs and better hole production. In soft, hard or variable rock, when core or blasthole drilling, Smit bits give maximum cutting speed in the roughest hole. Complete information by circling no. 6.

ROUGHEST, TOUGHEST MINING CABLES: Investigate Rome 60 mining cables and find out why so many mines standardize on them. They're available in styles for shuttle cars, for loaders and shovels, for drills and portable tools, for maintenance, and for shops and buildings. Circle no. 7.

SAVE 95% OF LUBRICANT: And do a 100% better job with Farval spray valves. Spread and maintain a uniform thin film of oil or grease evenly over all bearing areas. By eliminating friction and increasing efficiency, Farval sprays offer lower power costs and reduced wear. For Farval Spray Valve Bulletin No. 60, circle no. 8.

LOW - ALLOY HIGH - STRENGTH STEEL: Jalten replaces Otiscoley in Jones & Laughlin Steel Corporation's line of high tensile steels. Make your products stronger, lighter and longer lasting with Jalten. Receive Jalten's book of information by circling no. 9.

IMPROVED MINEMET FLOAT CELL: Representing the outgrowth of years of operating experience and development, the "Minemet" flotation machine is the subject of a new bulletin (in French) issued by the manufacturers, Minerais et Metaux in Paris. The machine, which has found wide usage in Europe, Africa and other parts of the world, combines mechanical operation with automatic aeration. The bulletin covers as well the company's line of laboratory test machines. Further information can be obtained by writing direct to Minerais et Metaux, 55, Rue d'Amsterdam, Paris 8, or by circling no. 10.

SPEAKING DIAPHRAGMS: Mine Safety Appliances Company now includes speaking diaphragms permitting voice transmission to other workers as standard equipment on all its demand type oxygen and air masks. Details on this "Cleartone" speaking diaphragm and related apparatus may be had by circling no. 11.

VIBRATOR: Delbert Wheeler, 2408 Harrison Street, Topeka, Kansas announces the Wheeler Testing Vibrator for sieves from six to sixteen inches in diameter. The new unit is convenient and accurate for either laboratory or field use. Receive details by circling no. 12.

NEW "ROOT PROTECTION" FLUX: Easily removable "Root Protection," a flux for inert gas welding on stainless steel, nickel, Monel, Inconel and "super" alloys, is produced by Eutectic Welding Alloys Corporation. Additional data on this back-up flux may be obtained by circling no. 13.

BETTER DESLIMING AND CLASSIFYING: The new Heyl & Patterson "Jet-Injection" cyclone gives improved performance in desliming and classifying; a result of the extensive Heyl & Patterson research program. For a copy of their "Jet-Injection" booklet, circle no. 15.

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UNITED STATES NEWS

Nevada Hearings Stress Need for More Titanium

The desperate need for increased titanium production was emphasized by Brigadier General Kern B. Metzger, chief of production resources, division of air material command, United States Air Force, at recent Senate committee hearings conducted by Senator George Malone (Nevada) at Henderson, Nevada. It was one of a series of Western hearings authorized by the Senate Interior Insular Affairs Committee to investigate the domestic mineral position.

Because it takes from three to four years for an airplane to travel from the drawing board stage to full production, designers must be able to know in advance how much titanium will be available in the future for the plane parts they specify. According to the general, a goal of 35,000 tons has been set for the needs of the aircraft industry alone, and yet by 1955 annual production will only be 13,400 tons.

General Metzger reported that annual production in 1953 is estimated at 3,047 tons while requirements are for 3,500 tons; in 1954, production would be 6,408 tons, and 9,800 tons would be required by the industry; in 1955 13,400 tons would be produced, and the need would be for 19,000 tons; while 35,000 tons would be the goal for 1956.

The four titanium metal producers at present are Titanium Metals Corporation at Henderson, Nevada; E. I. du Pont de Nemours and Company, operating facilities at Newport and Edge Moor, Delaware; Cramet, Inc., which is building a new plant at Chattanooga, Tennessee, and the United States Bureau of Mines.

GSA, Dept. of Interior To Cooperate On Minerals

Under terms of an agreement with the Department of Interior, the General Services Administration will receive the Department's technical advice and services necessary for the advancement of its program to expand the nation's supply of scarce and strategic metals and minerals. The GSA, instead of duplicating cost for services already performed by the Interior Department, will use the Department to make field inspections of mines, mining facilities, and mining and metallurgical research projects in construction, operation or progress under contracts negotiated by the Defense Materials Procurement Agency (which was terminated in August and whose contract responsibilities were transferred to GSA).

Technical personnel will be furnished on a reimbursable basis by field offices of two of the Department's agencies—the U. S. Bureau of Mines and the United States Geological Survey. Work will be performed on request. The three-man operating committee to carry out the plans includes: J. H. Hedges of the Bureau of Mines; Olaf Rove of the Geological Survey; and Clarence A. Fredell of the Materials Division of the GSA.

NOVEMBER, 1953

Block Leasing Plan Gains Favor Among Idaho Miners

Many zinc-lead producers in North Idaho's Coeur d'Alene mining district are turning to the incentive leasing plan to counter advance costs and declining metal prices. While it may not necessarily be possible for anyone to make a profit under present metal prices, to a small company it certainly is more equitable than most incentive systems.

The plan is not new; it has been used in many places for many years. It has worked well in the Grass Valley, California area since World War II, and has been in use in the Cripple Creek district of Colorado for over 50 years. Its application in the Coeur d'Alenes has been modified somewhat, but in general it is the same.

A block of ground is given to a lessee who recruits his own crew. The lessee furnishes his own labor, through partnership or hiring, his own steel, bits, powder, fuse, and insurance. Milling costs are split 50-50. The company receives from the lessee 50 percent of the net smelter returns as payment for furnishing the lease, equipment, timber, necessary small tools, air, water, hoisting of ore from the lessee's shaft pocket, and transporting same to the mill if concentrating at the company mill is desired.

The lessee has the right to carry on any development work in his lease block he deems necessary and may exploit any discovery under the terms of the lease. A legal lease is signed by both lessee and lessor.

Spokane-Idaho Mining Company revived the system in March of this year, and converted its entire mine production to this system in May. Since that time four or five other companies have followed suit, with Nabob Silver-Lead Mines and Highland-Surprise Consolidated Mining Company the latest to adopt the plan. Nabob has leased its entire workings above the 1,300 level, withholding only an ore body discovered on the main haulage level last year. Highland-Surprise has signed two lease contracts covering old upper workings. The firm will continue with its current DMEA deep-level exploration program.

AEC Extends Uranium Ore Buying Program To 1962

The United States Atomic Energy Commission has extended its uranium ore buying program in the Colorado Plateau area to March 31, 1962. The AEC also has announced a three-year extension in the period during which ore from new mines will be eligible for bonus payments. The AEC's action assured uranium miners of a market and guaranteed minimum prices for their ores for nine more years. The actions were taken to continue the commission's program of encouraging uranium production from domestic sources.

The program which was to expire on March 31, 1958 has been extended

through March 31, 1962. It provides guaranteed minimum base prices for the uranium oxide content of carnotite-type and roscoelite-type ores. The price schedule ranges from \$1.50 to \$3.50 per pound of uranium oxide content, depending upon the grade of the ore, together with certain allowances and premiums.

The program which established a bonus for initial and certain other production of uranium ores delivered between March 1, 1951 and February 28, 1954 has been extended through February 28, 1957. Bonus payments are made to eligible new mining properties for each pound of uranium oxide in acceptable ores delivered to qualified mills or AEC buying stations up to and including the first 10,000 pounds. For properties producing less than 10,000 pounds of uranium oxide during the period from April 9, 1948 to March 1, 1951, payments will be made on the difference between 10,000 pounds of uranium oxide and the number of pounds sold between the former date and the latter date.

Bonus payments range from \$1.50 to \$3.50 per pound of uranium oxide in acceptable ores produced from eligible mining properties, depending on the grade of the ore. Thus, the maximum bonus which may be obtained from new mines production ranges from \$15,000 to \$35,000, depending on the grade of ore delivered.

Payments are made directly by the AEC and not by the receiving station or mill and are in addition to purchase payments made pursuant to ore buying schedules. Before bonus payments are made, the producer must make application to the Commission, and the Commission must certify that the mine is eligible for bonus.

Copies of the program circulars may be obtained from the Commission's Grand Junction Operations Office, Post Office Box 270, Grand Junction, Colorado or from Division of Raw Materials offices.

ASARCO's Morning Mine Closes After 68 Years

Increased cost of labor and supplies, diminishing ore reserves, and low metal prices have caused the permanent shut down of the oldest continuously operated zinc-lead mine in the Coeur d'Alene district of Idaho—the Morning mine owned by the American Smelting and Refining Company at Mullan. The mill will operate on a one-shift basis to handle ore from the Frisco mine in the same area.

The Morning mine started producing in 1885 for Larson and Greenough. It was acquired by the Federal Mining and Smelting Company in 1905, and became a part of the American Smelting and Refining Company when Federal merged with ASARCO earlier this year.

Peak output reportedly was reached in 1939 when about 24,000 tons of lead, 20,000 tons of zinc, and 1,000,000 ounces of silver were produced. By comparison, in 1952 the mine produced only 4,654 tons of lead, 6,569 tons of zinc, and 163,110 ounces of silver.

precipitates — SOUTHWEST

Union Oil Subsidiary Developing Copper Mine

Pima Mining Company of Tucson, Arizona has completed its shaft to the 625-foot level on its property in the San Xavier district, and is drifting on the 300, 400, 500, and 600 levels. Further deepening of the shaft is being undertaken in an attempt to find the bottom of the copper vein which extends downward at a 45° angle and which is from 20 to 80 feet thick.

Pima is the wholly owned subsidiary of United Geophysical, Inc. which, in turn, is the wholly owned subsidiary of Union Oil Company of California. President of Pima and chairman of United Geophysical is Herbert Hoover, Jr.

Discovery of the ore body, the apex of which lies 225 feet beneath the desert surface, was by geophysical methods. Test drilling later confirmed the indication. Of 18 test holes drilled thus far, 16 have been positive. United Geophysical will continue to explore the claim, and it is expected that it may take six months to a year to determine the size of the find.

Pima has shipped 26,000 tons of ore, recovered in sinking the shaft and in drifting, to the American Smelting and Refining Company's smelter at El Paso, Texas. The ore has averaged from 5 to 6 percent copper. Mine development is directed by E. D. Spaulding and R. E. Thurmond is superintendent.

U. S. Smelting Suspends New Mexico Operations

United States Smelting, Mining and Refining Company has shut down all of its lead-zinc operations in New Mexico. The suspension laid off 185 men.

E. T. Lewis, Jr., manager of the Bayard lead-zinc mine in Grant County, announced the move with regret. He said the company had hoped in vain for "congressional action and other remedial measures to sustain and improve the price of zinc."

Anaconda Starts Operating Its Uranium Leach Plant

Anaconda Copper Mining Company has placed its new uranium leach plant in operation at Bluewater, New Mexico. The newest of nine uranium recovery plants treating Colorado Plateau uranium ores, this new plant uses the caustic leach method of treating high lime ore. Sandstone uranium reserves are developing rapidly in the Bluewater-Grants area of New Mexico, and it is possible that the plant will be expanded some time in the future to include a separate circuit to process sandstone-type ores.

Anaconda is also expanding its exploration and mining operations on the Laguna Indian reservation east of Bluewater. The company has recently awarded a stripping contract at its Jackpile mine to the Isbel Construction Company of Reno,

Nevada. This mine was found by means of airborne methods and subsequent diamond drilling from the top of the Mesa disclosed an important orebody. Plans are to mine the deposit by open stripping to varying depths. The waste will be blasted, removed, and dumped over the mesa rim southwest of the deposit. Simultaneously, the ore will be loaded and hauled from the northeast end of the pit.

John B. Knaebel is general manager of Anaconda's uranium operations with headquarters at Bluewater.



The *Black Hawk* manganese mine in Graham County, Arizona, is being operated by C. J. Rodham and R. M. Rutledge of Safford, Arizona. They have done considerable development work and for the last two months have been shipping hand-sorted ore to the Deming, New Mexico purchase depot, the ore assaying over 47 percent manganese. The operators believe sufficient ore has been developed to warrant mill construction. The mill is being erected alongside the Southern Pacific railroad, north of Pima, and ore is hauled to the mill site by trucks.

Lester Fernstrom has constructed a small mill about three-quarters of a mile west of Arivaca, Arizona; equipment includes a small crusher, ore bin, Herman ball mill, and one table. It has a capacity of about one ton per hour. Mr. Fernstrom is milling tungsten ores from his *Stewart* mine at Las Guijas and from his *Lex* and *Jimfre* mine in the Baboquivari Mountains. A small amount of custom ore is accepted and the mill operated intermittently according to requirements. It is reported that Fernstrom's old mill at Las Guijas has been sold and the equipment moved to Mexico.

Considerable damage to equipment at the *Boriana* mine at Yucca, Arizona, resulted from a recent cloud-burst. Dye and Bathrick of Kingman, owners of the mine and dumps, have been milling about 40 tons of dump material daily, then hauling the concentrates to Bishop, California, for cleaning and sale. They are employing a crew of about eight men and have been working on an expansion program to permit screening and milling of 150 tons of crude dump ore daily. The *Boriana* mine proper is under lease to Dan Harper and A. D. Allen who are reopening the 100, 300 and 500 levels. They have cleaned up and mucked out over 2,000 feet of tunnels and have milled some ore in the Dye and Bathrick mill. Their concentrates also are trucked to Bishop for marketing. About 10 men are employed on the lease. Over the mountain in Bull Canyon, on the extension of the *Boriana* veins, Dalton Robinson and two lessees have been mining and jigging scheelite and wolframite

from the quartz veins. These concentrates are sold through Dye and Bathrick.

The *Lead King Company* is sampling the *Ruth-Rattan* claims, seven miles northwest of Oatman, Arizona, following the unwatering of the Ruth shaft, a 400-foot incline. The mine was last unwatered in 1940 when *Tonopah Mining Company* and *Ventures, Ltd.* of Canada held the adjoining *Moss* mine and worked through the Ruth shaft in a crosscut to the Moss vein on the 400 level. Present work is directed by James H. McCarthy, general manager. A crew of six is employed.

A crosscut adit to the vein has been completed at the *Martin Brucite* mine, four miles northwest of Oatman, Arizona, and a carload of crude ore shipped to a San Francisco chemical plant on a trial basis. If the ore is satisfactory, a 400-ton stockpile is to be maintained to fill orders. The center 10 to 12 feet of the vein are said to run 62 percent magnesium oxide, a grade sufficiently high for the production of epsom salts. The property is owned by Bob Martin of Oatman and is operated by U. S. *Brucite Corporation* of Gabbs, Nevada. Robert O. Jones is general manager.

Operators of the *Wothree Mines*, 73 miles southeast of Kingman, Arizona, have decided to go ahead with construction plans for a 50-ton tungsten milling plant. The old mill will be rebuilt and additions made. The process decided upon after extensive metallurgical tests, calls for tabling, followed by roasting and magnetic separation. A 200-horsepower, Diesel-electric generator and other machinery were recently hauled to the mine. At present about 20 men are employed in plant construction and facilities rehabilitation work and plans call for a crew of 25 to 30. *Wothree Mines* operates the *Williams* tungsten mine, owned by Norman D. Fitzgerald, Abilene, Texas. George B. Blonsky of Kingman is general manager.

The *Revelation* group of claims, one mile east of Mayer, Arizona, and the *Cimarron* group, three miles southwest of Mayer, have been leased by the *Mayer Mining Company*. Both deposits are being opened and manganese ore is being stockpiled. In addition, a concentrator with a daily capacity of 150 tons is being constructed to up-grade the ore to a grade acceptable at the Wenden, Arizona Purchase depot. The mill, which is electrically powered, is scheduled for completion within the month. The work is directed by J. L. Franch, president and general manager. Ten men are employed.

The *White and Powers Mining Company* is sinking an inclined shaft at the *Loleta* mine. A depth of 60 feet has been reached and a crosscut has been started on the 60-foot level toward the vein to cut the vein below the caved portion. The *Loleta* is an old property; the upper portion of the vein has been mined out—reportedly by Spanish operators—and the old workings are caved. Values are in silver and copper. The company also has leased the *Monte Verde* and the *McCafferty* gold-silver properties. A small mill is being erected just west of Arivaca on Arivaca Creek to mill ores from the

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properties leased and also to handle custom ores from the Arivaca district. The McCaferty tailings dump—about 7,000 tons—will be milled first. The plant, with a capacity of 50 tons in 24 hours, consists of coarse and fine ore bins, jaw crusher, conveyor belt, Wemco feeder, Denver mineral jig, and two Deister tables. Flotation may be added later. Principals in the company are C. D. Powers and Jack White of Tucson; John D. Mitchell and Joseph Allen of Arivaca; and William Kitchen of Evanston, Wyoming. Frank Parker, Arivaca, Arizona, is mill superintendent. Mr. Mitchell is in charge of mine operations.

Thomas Claini and John M. Yazzie, two Navajo Indians, have received \$26,000 in initial production bonus payments from the United States Atomic Energy Commission for shipping high-grade uranium ore. Their claim, with a 200-foot-long drift, is located in the Monument Valley section of Arizona, near where Arizona, New Mexico, Colorado, and Utah meet. The bonus was in addition to regular payments for ore shipped to the site of the Shiprock, New Mexico uranium mill.

Ventures Limited, a Canadian firm, is reported to have taken a 30-day option on the *Sunnyside* group of claims operated by **United Minerals Corporation** of Salt Lake City and Lee Ferrell, near Patagonia, Arizona.

Golden Eagle Mining Corporation, has been incorporated in Arizona by Dennis H. Jackson and George K. Ishimoto of Los Angeles, and L. Mills Beam of Wickensburg, Arizona. Frank L. Snell of Phoenix has been designated statutory agent for the firm.

Photomosaic maps showing airborne radioactivity anomalies in the Defiance Uplift and Carrizo Mountains of Apache County, Arizona have been released by the U. S. Geological Survey. The anomalies represent areas of unusually high radioactivity as observed from the air and may or may not indicate the presence of uranium on the ground. The airborne reconnaissance work was conducted throughout the United States as part of a program on behalf of the U. S. Atomic Energy Commission.

Several properties are under development in Santa Cruz County, Arizona. I. L. Watts, C. L. Jernigan, and Walter Botts have completed roads to the *Arizona Girl* and *Little Annie* properties in the Gold Hill district and have moved in machinery and equipment. About 200 feet of new drifting has been completed. The ore contains lead and silver, with some gold. Richard Taylor has leased the *Old Soldier* gold-silver property south of Ruby, and expects to start production and shipment of siliceous silver ores. Fred Noon reports that assessment and development work has been completed on five gold-silver-lead-zinc properties he is operating—the *Blanco*, *Ansterlitz*, *Choctaw*, *Blue Ribbon*, and *Black Diamond*.

John W. Donowick has taken out prospecting permits and options to lease a three-square-mile area of the Navajo Reservation in Arizona. He plans to begin extensive prospecting as soon as incorporation of his newly formed *Coronado Development Company* is completed. Mr. Donowick reportedly believes that he is on the track of the world's largest diamond field—having obtained clues to the deposit by following old legends and writings of Coronado and others.

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H. V. Hughes and Associates have leased a tungsten property in the Beauty Mountains near San Diego, California. L. E. Shaffer, professor of mining at the University of California and vice chairman of the Division of Mineral Technology at the University, has been retained as consultant. He has been at the property programming the development work. Plans call for open cutting of the deposit and installation of a 50-ton mill. R. J. Kincaid, secretary-treasurer of **Southwestern Engineering Company** of Los Angeles, is a partner in the venture.

The **Irelan** mine near Alleghany, California, at one time also called the **Three Kings** mine, is reported to have been reopened. New mine rails, pipe, and a compressor were to be installed, with production to get under way soon.

The **Walkeng Mining Company**, is operating a gold property near Taylorsville, Plumas County, California where ore is now being stockpiled. The mine lies between the **Walker** and **Eagle** mines. Rehabilitation and development work have been under way for over a year. Consideration is being given to erection of a mill on the property.

Idaho Maryland Mines Corporation of Grass Valley, California has driven a crosscut on the 1,950 level through to the No. 35 drill hole. Gold ore encountered is considered to be of good milling grade. For the month of July, the firm has reported a nominal profit from about 11,000 tons of ore milled before depreciation and depletion. This is an improvement over the losses reflected by operations during preceding months.

The property on which the **Oro** gold mine is located near Downieville, California, has been purchased by Dr. and

Mrs. Philip S. Newton of Piedmont, California. The mine was operated some years ago by the **Associated Metals Company** but has not been worked for the past few years. The present owners do not plan to work the mine.

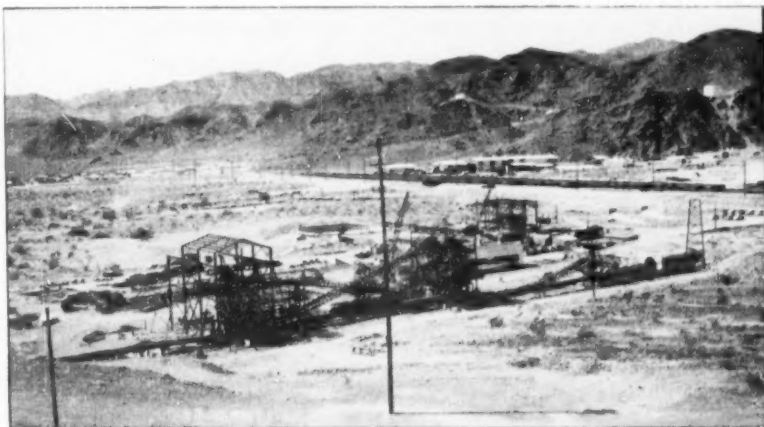
More than a mile of quarry face is now open for working at the **Kaiser Aluminum & Chemical Corporation's** dolomite plant at Natividad, California. Two new benches have been cut into the quarry to allow for more efficient production and lower operating costs. The two new benches were cut in from the 700-foot level, and are now at the 850- and 812-foot levels. A new access road will serve both locations. Dolomite rock from the two new benches will be trucked to the 700-level where it will be crushed in a primary jaw crusher and then carried to the heavy media separation unit by conveyor.

Elmer E. Dunn is reported to have started development of his asbestos claim, 3½ miles northwest of Nightingale's Camp, Mountain Center, Riverside County, California.

The **California Division of Mines** has published two new reports. One, entitled "Geological Investigations of Strontium Deposits in Southern California," describes celestite deposits in San Diego County and San Bernardino County. The other, entitled "Geology of the Santa Rosa Lead Mine, Inyo County, California," describes the geology of the eighth largest lead producer in the state.



Manganese, Inc. hopes to have its processing plant at Henderson, Nevada back in operation by January 1954. The entire heart of the plant, consisting of



KAISER BUILDS EAGLE MT. IRON PLANT

Construction progress at the new crushing and beneficiation plant at the Eagle Mountain, California, iron ore mine of the Kaiser Steel Corporation is shown in the picture above. The plant was designed and is being erected by Kaiser Engineers, with a designed capacity of 700 tons per hour. It will treat ore mined from the North and South ore bodies. The building at the left houses two seven-foot cone crushers; the one at the right houses the screening plant. Construction to house the drum separator and magnetic separators is shown in the near background. The long string of loaded railroad cars in the background is ready for shipment to the Kaiser steel plant at Fontana, California. For further details of the new plant see May, Mining World, pp. 53, 54.

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conveyor to grinding circuit ore bins, grinding section, flotation section, thickener pump house, reagent tank and flotation concentrate storage tank, were completely destroyed by fire last June. The new plant is being designed, engineered, and installed by the Manganese Inc. staff. The nodulizing plant is expected to start work in December on stored government concentrate produced during the kiln shutdown.

Hadsel Products Company is constructing a chemical products manufacturing plant near Wells, Nevada. Raw material for the operation will come from the firm's Polar Star mine which is prin-

cipally a lead, zinc, and barium sulphate deposit.

Diamond drilling has been completed at the Gold Pick mine north of Tonapah, Nevada. L. G. Palmer and A. P. Decker of Bishop, California were the drilling contractors.

Manganese ore is being mined on the Fay Steward lease 25 miles northwest of Hiko, Nevada. The lease is being operated by Combined Metals Reduction Company.

Standard Slag Company of Gabbs, Nevada is mining iron ore at the Stokes open-pit mine for future shipment. The ore is crushed and stockpiled at the mine

which is six miles east of Gabbs, in Nye County. According to R. O. Jones, general manager, this mine has been the largest producer in Nevada in past years, shipping iron ore to Japan.

The Coranda Corporation of San Jose, California has completed a joint-DMEA diamond drilling program on corundum-andalusite deposits near Hawthorne, Nevada. The Green Tale and Bismark properties were drilled. The diamond drilling was contracted by Processed Diamond Bit and Tool Company of San Francisco. Laboratory analysis was made by Robert Holt with the aid of a Beckman spectrophotometer in a laboratory set up by Coranda in Hawthorne.

The Kingston mine and 75-ton mill which have been inactive for the past two years are being reopened by Gordon Scheckler and associates who have leased the property. The mine, located in Kingston Canyon, Nevada, was an early day active gold and silver producer.

United States Lime Products Corporation produced 28,000 tons of limestone and 9,000 tons of finished products during the month of July at its plant at Henderson, Nevada.

Alpine Mining Company reports that both lead-zinc ore bodies were intercepted between the haulage level and the No. 2 level driven from the shaft at the firm's Noonday mine, 55 miles southeast of Wells, Nevada. An ore body seven feet in width has been cut on the shaft level and the intermediate ore has been followed for a distance of 80 feet. Between the No. 2 level and surface a large tonnage can be claimed as mill ore.

Alex Dufurrena of Winnemucca, Nevada and Pete Knasio of Fields, Oregon are reported to have sold their tungsten property on Bartlett Creek in the Leonard Creek mining district to Fred Bartell of Springfield, Oregon. Joe Thompson of Bend, Oregon, and Kenneth Watson of Dalles, Oregon. The property is located 100 miles north of Winnemucca and was prospected earlier this year. Plans call for immediate development by the new group and a power shovel and loader have already been shipped in to speed operations. The group has also been reported to have purchased the Cane Springs mill to treat the ore from the mine.



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Construction is almost completed on a large pilot plant being erected by International Minerals and Chemical Corporation at Carlsbad, New Mexico. The plant will test and develop a new dry beneficiation process for potash ores.

A new firm, Tungsten Consolidated, is reported to be shipping columbite from a discovery near Petaca, Rio Arriba County, New Mexico. Several thousand pounds are reported to have been shipped to Kennametal Inc. at LaTrobe, Pennsylvania for processing. Ross Martinez and Glen Slater are in charge of the Petaca mining operations.

precipitates—CENTRAL and EASTERN

New DuPont Plant Will Raise Ilmenite Supply

A \$3,000,000 mine and plant which will produce ilmenite are under construction for the E. I. du Pont de Nemours and Company near Lawley in north central Florida. Somewhat similar to Du Pont's Trail Ridge plant near Starke, Florida, the output will help the company to meet the increasing demand for titanium metal and titanium pigment.

Humphreys Gold Corporation of Denver, Colorado is building and will operate the plant for Du Pont. Production is expected early in 1955 with output to be about 100,000 tons a year. Known as the Highland plant, it is located on about 5½ sections of land about 17 miles north of the present plant.

Mining is done by a dredge floating on a "traveling lake," about a half mile long and 500 feet wide, dug out of the sandy soil. The sand is pulled up by a suction dredge and piped directly to a floating "scrubber" barge. There the organic coating is removed and the heavy black mineral separated from the white sands by a system of spirals in a "wet mill." This system was originally devised by Humphreys as an improved method of concentrating gold sands.

Agreements Concluded By Michigan Power Companies

The Upper Peninsula Power Company of Houghton, Michigan will take over transmission and distribution facilities of the Cliffs Power & Light Company and, in the future, will supply electric energy to the iron mines and other industrial, wholesale, and retail customers formerly served by the Cliffs company in Negaunee and Munising, and the Inland Line and Stone Quarry located near Blaney, Michigan. Upper Peninsula will transmit power from the Cliffs plants to the operations of Cleveland-Cliffs Iron Company of which the Cliffs power company is a subsidiary.

Through the formation of the Upper Peninsula Generating Company, the two companies will jointly own and construct a lake-side steam generating plant for which the tentative location is Marquette. The Upper Peninsula company will also build a transmission line from Humbolt to Atlantic which will interconnect its present system with that of the system to be acquired from the Cliffs power company.



Low prices for lead and zinc, coupled with high costs and excessive imports, are blamed by the American Zinc, Lead & Smelting Company for its 25 percent

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reduction in smelter production of prime western zinc. The company has curtailed its operations at the Fairmont, Illinois smelter by 1,800 tons per month resulting in the lay-off of about 400 workers.

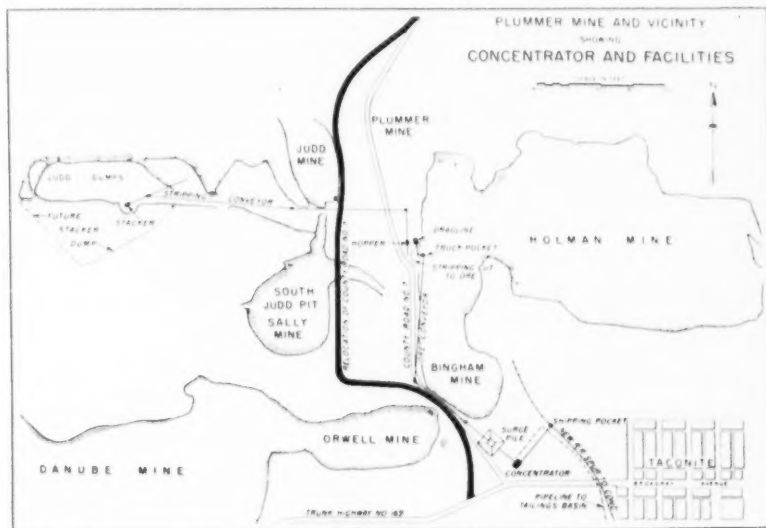
A panel of independent engineers is considering the case of Westmoreland Manganese Corporation which is seeking an additional \$1,000,000 to complete construction of its plant at Batesville, Arkansas. The Defense Materials Procurement Agency has already advanced \$2,921,640 out of \$3,807,250 allocated for the project. The panel will determine whether it is in the best interests of the government to invest the remainder of the allocated funds. The contract with Westmoreland was negotiated in April 1952. The plant was to get into production within eight months and into capacity production by April 1953. Delivery of 264,000 long tons of concentrate was to be made within six years after start of production or by June 1959, whichever was earlier.

The Zonolite Company of Chicago has acquired two vermiculite processing plants. In New Orleans, Louisiana, the company has taken over the plant of the

former Southern Mineralite Company, Inc. The Texas Vermiculite Company, a Zonolite subsidiary, will move its main office from Burnet, Texas to new facilities in Dallas, Texas, acquired from another building firm. Vermiculite equipment has been installed in the new plant to supplement operations at Burnet.



The International Minerals & Chemical Corporation triple superphosphate plant at Bonnie, near Bartow Florida has resumed operations after a 54-day strike. The new \$14,000,000 plant had only been in operation a short time when workers walked out in a dispute over a contract covering labor. The new contract calls for a top hourly pay rate of \$2.00 for the most highly skilled craftsmen.



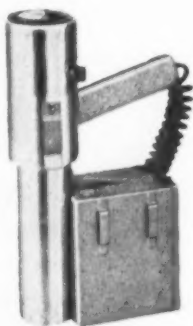
ANOTHER MESABI IRON ORE PRODUCER

The Plummer mine near Taconite, Minnesota is the newest of Oliver Iron Mining Division, U.S. Steel Corporation's iron ore producers. As can be seen above, it is located between the Holman and Judd mines operated by Oliver from 1907 to 1925. County Highway No. 7 which previously ran through the pit has been relocated to the west of the property. A huge dragline is presently stripping at the proposed truck pocket. Waste material is hauled by belt conveyor to the dumps south of the old Judd dumps. Power shovels, heavy-duty trucks, and a belt conveyor system will be used in mining operations. Ore will be loaded into trucks and hauled to a crushing and screening pocket in the pit similar to the system used at Oliver's Hull-Nelson mine in Eveleth. From here a conveyor will transport the ore to the ore treating plant, now being constructed on the south edge of the pit, which will produce 1,200,000 tons of iron concentrate annually by beneficiation of about 2,500,000 tons of low-grade material. Regular shipments are scheduled to begin early in the 1954 season. The mine is named for William H. Plummer, former general superintendent in charge of Oliver's Canisteo district operations.

With the arrival of the "Q" meter for testing non-ruby mica, the *United States Government Mica Purchasing Depot* in Spruce Pine, North Carolina will begin to buy non-ruby mica. Shipment of the

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electronic device had been delayed about a month longer than expected because of the need for exact comparison with the master "Q" meter at *Bell Laboratories* in New Jersey. Mica producers in the area must get appointment times for bringing in their mica and may not deliver more than 200 pounds at one time in order to prevent congestion and give everyone an equal opportunity to sell.

The *International Minerals & Chemical Corporation* has ordered sharp cutbacks in production of phosphate rock in Florida. The *Noradyn* mine has been reduced from a seven-day operation to five, while the *Achan* mine is being shut down completely for the time being. Reason for the production decrease was attributed to "producing more rock than we have been shipping." Company officials claimed that the recent strike at the *Bonnie* plant had in no way affected this decision.

A Scintillation Counter Symposium, which will present recent advances in this branch of technology, will be held in Washington, D. C., January 26-27 at the Statler hotel. Sponsors of the symposium are the American Institute of Electrical Engineers, the Institute of Radio Engineers, the United States Atomic Energy Commission, and the National Bureau of Standards. Committee chairman is G. A. Morton of the *Radio Corporation of America* laboratories in Princeton, New Jersey. H. O. Wyckoff, of the National Bureau of Standards in Washington, D. C., is chairman of the attendance committee.



The first iron ore has been shipped from *Pickands Mather & Co.'s Fortune Lake* open pit mine northwest of Crystal Falls, Michigan. The past year has seen the completion of surface buildings and construction and installation of crusher, ramp, and railroad tracks.

The *North Range Mining Company* of Negaunee, Michigan has recently completed negotiations for the purchase of the *Zontelli* washing, jigging and *Wemco* mobile-mill plant that has been operated since 1949 by *Zontelli Brothers*, at the *Penokee* mine, Ironwood, Michigan.

North Range plans to disassemble the plant this fall and remove it to the *Book* mine near Crystal Falls, Michigan where it will be used to treat old stockpiles and current underground production. *Zontelli* used the plant in treating low-grade piles produced over the past 50 years from the underground mines near Ironwood.

The *Western Mining Company* has completed the preliminary phases of its stripping program at the *Tioga* mine, the operation which is furthest west on the *Mesabi Iron Range*. Contrary to original expectations, this property, located adjacent to a number of lakes, did not present a difficult water problem. It is anticipated that actual ore production will start early in 1955.

August was an important month in iron ore production with several records being set. Shipment of iron ore by lake vessel during the month totalled 15,236,527 gross tons—the greatest for any month on record. The *Duluth and Two Harbors* docks of the *Duluth, Mesabi & Iron Range Railroad* loaded a total of 7,110,807 gross tons of iron ore during that month to assist materially in breaking the monthly shipping record, while at the same time breaking their own record for loadings for the month.

As a result of the unusually large production of iron ore during the early part of this season, a number of washing plants closed down six weeks earlier than usual. The first to reach its quota was the *Lake concentrator* of the *Mesaba Cliffs Mining Company* near Taconite, Minnesota, which shut down on September 11. This was followed by the *Holman Cliffs* and *Hill Trumbull* plants of the *Mesaba Cliffs Mining Company* which ceased operation for the season on September 18. A number of additional plants closed during the last week in September. Nearly all washing plant operations cease about October 15 with a few running as long as the weather will permit.

Diamond drilling is now under way at the *Sunday Lake* mine on the *Gogebic Range* at Wakefield, Michigan. The mine was first opened in 1885. *Pickands Mather & Co.* recently sunk a new shaft and erected a new building to house offices, shops, change rooms, etc. According to R. D. Hodge, superintendent, the drilling is being carried out to ascertain the extent of remaining ore. From past experience with *Gogebic* ore bodies, the remaining ore at this location is known to be in excess of the amount necessary to amortize the new shaft and building.

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Northwest Mining Assn. Meets Dec. 4-5 in Spokane

Frank N. Marr, president of the Northwest Mining Association which will meet in Spokane, Washington on December 4 and 5, has announced that Karl W. Jasper of Spokane, president of Grandview Mines and of Metaline Mining and Leasing Company, will be convention chairman.

E. C. Stephens, past president, will be program chairman. J. C. Kieffer of Wallace, Idaho, chairman of the Columbia section of the American Institute of Mining and Metallurgical Engineers, will arrange the technical portion of the program. Robert N. Towne will be in charge of the arrangements, and E. K. Barnes and David Watson will be in charge of the finances.



The *Bradley Mining Company* has been milling 500 to 600 tons of chival scheelite ore from its newly opened *Litlington* mine near Yellow Pine, Idaho. The oversize rock is discarded. Undersize is screened in a trommel and fines jigged and tumbled to make a concentrate. This concentrate is reclaimed at the company's *Ima tungsten* mine near Patterson, Idaho, and up-graded to specification. Communications with the mine in the remote wilderness of central Idaho are by radio. Many spare supply items and equipment have been air-dropped to speed operations.

The *Triumph Mining Company* has reopened the 900-foot level of its *Triumph* mine near Ketchum, Idaho, and stoping of lead-zinc sulphide ore has started. This is normally considered to be one of the mine's upper levels and is the first time that production has been underway in this section of the mine for several years.

Exploration work proposed by *Centrida Mines, Inc.* of Kellogg, Idaho at the old *Pope-Shenon* copper mine near Salmon, Lemhi County, calls for 150 feet of crosscutting and 500 feet of drifting on the 600 level, 150 feet of drifting on the 500 level, and diamond drilling. Frank A. Taft of Kellogg will direct work. *Coeur d'Alene Silver Giant, Inc.* of Kellogg has a one-third participating interest.

Stockholders of *Vindicator Silver-Lead Mining Company* have approved an agreement under which *Silver Buckle Mining Company* of Wallace will undertake to sink an 800-foot shaft and do other development work at the *Vindicator* property near Mullan, Idaho. *Silver Buckle* will receive a 50 percent interest in *Vindicator* ore, and the companies will exchange 100,000 shares of stock. W. J. Logus of Seattle is president of *Vindicator*.

NOVEMBER, 1953

Clayton Silver Mines, Custer County, Idaho, is milling 100 tons of ore daily and shipping four cars of silver-lead concentrates monthly. Zinc concentrates, totaling about one-half car monthly, are being stockpiled. Fifteen men are currently employed. Norman M. Smith is directing engineer.

A crosscut from the 1,200-foot level of the *Sunset Minerals* shaft on Pine Creek near Kellogg, Shoshone County, Idaho, has been pushed more than 1,800 feet to within about 500 feet of the projected downward extension of the main *Lookout Mountain Mining & Milling Company* vein structure. A zone of stringers containing copper, lead, and zinc was passed through recently.

The *Little Pittsburg* mine in the same district, owned by *Pine Creek Lead-Zinc Mining Company* and under lease to *Mascot Mines, Inc.*, is being operated on a standby basis with output at a minimum of 25 tons daily because of current low prices for base metals. Smelter returns have been running only about

one-third those of a year ago. Crew has been reduced to seven men. Claude E. Nugent is secretary-treasurer of the *Pine Creek* firm.

Clearwater Mines, Inc. has trucked about 100 tons of copper-gold-silver ore from its *Niagara Creek* property in southeastern Shoshone County, Idaho 30 miles to the *Nancy Lee Mines* mill near Superior, Montana. The mill is leased by Ernie Smith of Osburn, Idaho. The ore was mined from the 1,200-foot main adit tunnel opened this summer. Some ore recently was opened about 700 feet from the portal. Since June, mine buildings have been rehabilitated, mining equipment installed, two tunnels cleared and retimbered, 100 feet of shaft unwatered, and ore opened at the 100-foot shaft level. Work has been under supervision of Leon Saboe of Hollywood, California who is president and manager.

Production has been started by *Ione Mining Company* from a lead-silver ore body discovered a year ago at its property near Murray, Shoshone County,



KOOTENAI DIKE EXPANDS IDAHO HOLDINGS

Kootenai Dike Mines, Inc. has added to its holdings in the Moyie-Yaak district near Leonia, Boundary County, Idaho, and has been carrying on exploration work at two locations. Heavy excavating equipment has opened a lead-zinc-silver-bearing vein to a depth of about 50 feet on the *McGinty* claim recently purchased, along with six other patented claims and a patented mill site, from Vernie Rees and Louis A. Larsen of Spokane. Diamond drilling is under way. The photograph above, taken at the site of the exploration work on the *McGinty* claim, shows how modern heavy equipment can afford a better view of vein structures than oldtimers were able to uncover by tunneling. Two tunnels and a raise driven by early-day operators are shown in the background. A diamond drill is at the extreme right. Dr. Ray E. Currie, left, is president of *Kootenai Dike*, and Richard P. Van Horn, right, is vice president and general manager. The company has also reopened and retimbered the 210-foot *Grubstake Tunnel* on the *Homestake* claim, one of those purchased. Track has been laid and the tunnel is being extended to tap an ore shoot 120 feet vertically below the 60-foot deep *Homestake* shaft from which 100 tons of crude lead-silver ore were shipped many years ago.

Idaho. High-grade is being sorted for direct smelter shipment and mill-feed trucked to the Golconda custom mill east of Wallace. Ore is coming from workings west of a raise above the main tunnel level. Otto M. Nordquist, company president, is in charge of work.

The Lucky Friday ore body has been found in place on the new 2,300-foot level of the *Lucky Friday* mine east of Mullan, Shoshone County, Idaho. Where intersected 184 feet from an offset winze from the 2,000 level, the ore was six feet wide, with 18 inches of solid high-grade. Values are in lead, silver, and zinc. The Lucky Friday vein has been improving both in length and mineral content with depth. On the 2,000 level, ore was opened for a distance of 999 feet. Mike Sekulic of Mullan is president of *Lucky Friday Silver-Lead Mines*.

Goldstone Mining Company's new lower level adit near Salmon, Lemhi County, Idaho at last report had been driven 1,825 feet to within an estimated 175 feet of the Goldstone vein which yielded gold-copper ore in upper levels. The adit was being advanced on a two-shift basis. A raise on the vein to connect with the 600 level is scheduled for completion by January 1. Construction of a mill building to house concentrating equipment on the ground is expected to start next spring. B. W. Porter of Seattle, Washington is company president.

Sunshine Mining Company's 3400-level crosscut toward the Yankee Girl vein in *Metropolitan Mines Corporation* ground had less than 250 feet to go, at last report. It will intersect the vein midway between the richest stoping areas mined on the 3,100 level. The properties are in Shoshone County, Idaho.

Hypothec Mining and Milling Company has leased its upper East Hypothec workings in the Pine Creek district of the Coeur d'Alene mining region to *Bres Mining Equipment Company*. The lease is limited to mining of ore opened above the 300 shaft level. Roy Kingsbury, Wallace, Idaho, is secretary of Hypothec.

San Francisco Chemical Company is making progress at its *Cumberland* underground phosphate mine near Montpelier, Idaho. The "Z" bed encountered at 542 feet from the portal is providing new reserves. A long crosscut is being driven through the footwall to connect the "Z" beds along the strike of the deposit. A 400-foot raise is also underway to surface to aid safety and air conditions.

Circ Twins Mining Corporation of Orogrande, Idaho is planning construction of a 300-ton mill to treat a large deposit of low-grade, copper-gold-tungsten ore indicated in tests conducted since 1941. A public stock offering is reported being made. Ross R. Brattain of Orogrande is president and general manager.

The *Four Square* tungsten-gold mine and 100-ton mill near Murray in Shoshone County, Idaho have been offered for sale by A. A. M. Arnold of Wallace, partner in Trinity Trust which acquired them through foreclosure several years ago. Last production was in 1938.

Ore Mining Syndicate of Kellogg, Idaho has been incorporated for \$100,000 by A. L. Osborn, David D. Lohoefer and Earl Chilcott, all of the Shoshone County mining community.

At the old *Galena* property of *Vulcan Silver-Lead Corporation* at the east end of the Kellogg-Wallace silver belt, American Smelting and Refining company is mining and milling between 3,000 and 4,000 tons of ore monthly. Production is from a silver-copper vein discovered on the 3,000-foot level last February and from a lead-silver zone found previously. The silver-copper vein is being developed on the 2800 level. A raise from the 3000 was in high-grade throughout. ASARCO has been developing the property for several years under lease. *Callahan Zinc-Lead Company* of New York owns 58 percent of *Vulcan* stock. Joseph T. Hall of New York is president of *Callahan Zinc-Lead*. J. E. Berg of Wallace is western manager for ASARCO.

Polaris Mining Company started work recently on its *East Exploration* project from the 3,000-foot level of its *Silver Summit* mine west of Wallace. Work is being pushed on an around-the-clock basis. At a cost of nearly \$700,000, half of which is being loaned the *Hecla Mining Company* subsidiary by the DMEA, *Polaris* will drift nearly two miles and do 15,000 feet of diamond drilling along the same mineralized zone which yields ore in the Silver Summit. *Polaris* has operating agreements with *Merger Mines Corporation*, *American Silver Mining Company*, *Silver Standard Mining Company*, *Rainbow Mining and Milling Company*, *Coeur d'Alene Mines Corporation*, *Callahan Consolidated Mines*, and *Coeur d'Alene Consolidated Silver Lead Mines*. *Coeur d'Alene Mines* relinquished operating agreements with several of the firms and turned its 2,800-foot shaft, mine plant and 300-ton concentrator over to *Polaris* for maintenance and possible use. L. J. Randall of Wallace is *Polaris* president.

National Silver-Lead Mining Company is reopening the middle tunnel on its property up Big creek, east of Kellogg, Idaho. Roy H. Kingsbury of Wallace is treasurer.

In the Pine Creek district southwest of Kellogg, Idaho, *Lookout Mountain Mining Company's* crosscut from the 1200-foot level of the *Sunset Minerals Company* shaft has been driven more

than 1,700 feet. This is more than two-thirds of the estimated distance to the anticipated downward extension of lead ore shoots mined years ago on upper levels of the *Lookout* mine.

Surface bulldozing and tunnel rehabilitation have been done by *Western Silver-Lead Mines Corporation* in performance of annual assessment work at its property 1½ miles east of Wallace, Idaho. Harry F. Magnuson of Wallace is a company director.

Planned rated capacity of 400 tons of placer material daily is being handled by *Gibbonsville Mining and Exploration Company* at its new flotation plant in the Coeur d'Alene River Valley west of Kellogg, Shoshone County, Idaho. The area being worked formerly was a settling basin for mill tailings washed down the river. After extraction of debris, sand and moisture, about 300 tons of dry feed are processed into approximately 30 tons of concentrate. The lead-silver-zinc concentrate is trucked to the nearby *Bunker Hill* smelter. Wellman Clark of Spokane is vice president.

Articles of incorporation were filed recently at Boise, Idaho for *North Idaho Mines, Inc.* of Kellogg. Incorporators are Robert Sparling, Seattle; Harold St. John, Spokane; and Albert M. Nash, Kellogg.



Minerals Engineering Company has finished all concrete foundation work at its new tungsten mill at Glenn, Montana. Irving and Nelson have completed installation of new mining equipment to increase manganese production at their *Garibaldi* mine north of Butte, Montana.

Coronado Copper and Zinc Company, Los Angeles subsidiary of *Cyprus Mines Corporation*, has undertaken to develop holdings of *Mineral King Mining Company* near Salt Lake, Mineral County, Montana. It sought a development agreement last year but the *Mineral King* firm signed a lease and profit-sharing contract with *Federal Mining and Smelting Company*. *Federal* dropped its lease recently. *Coronado* will develop the old *Tarbox* and *Meadow Mountain* groups, totaling 32 claims, for half of any returns. These properties adjoin the *Ben Hur* and *Last Chance* groups owned by *Jupiter Mining Company*, subsidiary of *Day Mines, Inc.*, Wallace, Idaho. Surface bulldozing was started immediately upon signing of the agreement. S. K. Garrett is vice president and resident manager in Wallace for *Coronado*. C. F. Buls of Missoula heads *Mineral King*.

Florian L. Glinski of Helena, Montana has entered into a \$33,600 DMEA contract to explore the old *Snowshoe Gulch* copper mine in Powell County for tungsten. Early day operators overlooked the scheelite content of the copper ore. Initial work calls for bulldozing and diamond drilling. This will be followed by tunnel work if results justify. The government's share of the cost will be \$25,200.

The *American Chrome Company* has started its second 500-ton gravity con-

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centrating unit at *Mouat* mine near Nye, Montana. George Griswald, consulting metallurgist, has been at the mill during initial operations. Mining continues by shrinkage and benching stoping. Ring drill stoping has been considered.

Swansea Mines, Inc. has found good milling grade gold-silver-copper ore on the new No. 4 level of its *Silver Bell* mine in Lewis and Clark County, Montana, and is considering construction of a new mill. The strike was made in extending a drift southerly along the Silver Bell vein. At last report, ore had been opened for a distance of 130 feet. The face was about 180 feet from being vertically under the widest part of the vein in upper levels. More than 500 feet of backs can be obtained by this work. Tentative plans call for erecting the mill building this fall so equipment can be installed during the winter months. C. L. Hewitt of Helena is company president.

The *Pony Tungsten Enterprise Company* is converting its mill to treat scheelite-bearing ore from the old *Strawberry* mine two miles west of Pony, Montana. The high-purity scheelite occurs in the hanging wall of the Strawberry vein.

The *January* mine, about six miles south of Winston, Montana, is now being reopened for mining of lead, zinc, and silver ores. About 10 men are employed at the operation.

A two-man crew from the U.S. Atomic Energy Commission office in Grand Junction, Colorado, has been exploring the Judith, Moccasin, Bear Paw, Crazy, and Highwood Mountains in central Montana. The igneous rock that makes up the core of these mountains is reported to be favorable for ore and uranium deposits.

The *Anaconda Copper Mining Company's* Great Falls, Montana reduction works will be expanded to include facilities for processing aluminum ingots. The new aluminum plant being constructed by the *Anaconda Aluminum Company* at Columbia Falls, Montana will produce the aluminum ingots which will then go the Great Falls plant for conversion to rod and wire.

Discovery of a commercial quantity of vanadium ore has been reported by the U.S. Bureau of Mines in the region of the Judith Mountains northeast of Fort Maginnis, Montana.

Grizzly Gold Mining Company, recently incorporated for \$300,000 by Joe Butzerin and William E. Cullen of Spokane and Lyman H. Bennett, Jr., of Bozeman, Montana, has announced plans to develop the *Easton-Pacific* group of 25 claims at Virginia City, formerly under lease to U. S. *Grant Mining Company*. A 100-ton mill is planned.



Exploration work is being conducted by the *Morrison-Knudsen Company* of Boise, Idaho, on a limestone deposit west of Durkee, Oregon. Diamond drilling is

underway now that bulldozing and road building have been completed.

The Chicken Creek mining district of Oregon is being explored for scheelite. John Arthur, W. A. Pierce, J. A. Hinchey, and Nadie Strayer are exploring 16 claims, including the *Little Bonanza* and *Little Hill* mines which produced gold in earlier days. Also being developed in this district are the *Gleason* and *Meridian* mines controlled by Mr. McCullum of Limer.

A pipeline has been installed at the *High Bar* placer operation above Pine Creek in Baker County, Oregon where the *United Mining and Metals Corporation* is conducting hydraulic mining. Water from Burnt River will be pumped to a reservoir and then to giants at the pit. H. L. Bruneau is in charge of operations.

The old *Alameda Mines'* gold-copper property 15 miles west of Grants Pass, Oregon, has been optioned by *Transcontinental Resources, Ltd.* of Canada. Workings have been unwatered to the 350 level. A diamond drill hole from the 150 level intersected a good ore showing.

Morris L. and Chase J. Page have a \$5,600 contract with the Defense Minerals Exploration Administration to explore for cinnabar north of Mill Creek in Crook County, Oregon. The government's share in the contract amounts to \$4,200. Ed Lewis of the *Horse Heaven* mines is supervising engineer.



Two zinc-lead producers in northeastern Washington's Metline mining district have reduced their work weeks from six to five days. This was done to eliminate time-and-one-half pay for the sixth day and to cut operational costs to counter low base metals prices. First to make the move was *American Zinc, Lead and Smelting Company*, operating the *Grandview* mine and mill. It also changed over from a two-shifts-per-day basis to one shift. A score of men were laid off and production dropped from about 22,000 tons of ore monthly to approximately 16,000 tons. *Pend Oreille Mines and Metals Company* went on a five-day week a few days later. The firm had been on a six-day week since 1937. All employees were retained, however, and construction continued on the third 800-ton unit of the company's new flotation plant. The final unit is scheduled for completion by year's end.

The *Lone Star* mine in northern Ferry County, Washington, a World War I copper producer, will be explored at depth by *Attwood Copper Mines, Ltd.*, a Canadian concern, under a \$109,196 copper exploration contract with the Defense Minerals Exploration Administration. The property, on the British Columbia border, will be explored by a new lower adit and by diamond drilling. The mine is in the southern extension of the

Boundary mining district, home of the famed old *Phoenix* and *Greenwood* copper camps in British Columbia. Attwood Copper has been carrying on geological work and diamond drilling in the area for two years. It acquired the *Lone Star* last spring from *St. Eugene Mining Company*, subsidiary of *Ventures, Ltd.* of Toronto, D. F. (Cap) Kidd of Vancouver, B.C., is general manager of Attwood Copper. *British Columbia Copper Company* during the first world war transported *Lone Star* ore more than five miles by aerial tramway across the Canadian border to the Boundary Falls smelter.

Jim Creek Mines, Inc. of Spokane, Washington has been making good progress on a \$47,500 DMEA lead-zinc exploration project on *Jim Creek*, 10 miles northwest of Ione, in Pend Oreille County's Metline district. An incline shaft, down 100 feet last spring, has been deepened to the 178-foot mark. A station has been cut at the 150-foot level and a 79-foot crosscut driven to a vein uncovered by a bulldozer last year and subsequently opened at the 50-foot level. Drifting two ways on the vein has been started at the lower level. The mine plant has been electrified and new equipment installed. Four men are working under contract. Frank H. Mitchell is consulting engineer in charge.

Kaniku Metals, Inc. has been organized by E. J. Cowan and M. F. Flannigan of Tacoma and Norman D. Lindsley, Colville mining engineer, to acquire and develop mining properties in Pend Oreille County, Washington. Holdings acquired from *Grandview Mines* of Spokane and George and Henry Rushmeir, Smackout Valley prospectors, are the *Rocky Creek* group near headwaters of Rocky Creek; the *Snowshoe* claim near the head of Currant Creek; the *Bearpaw* group adjacent to the *Jim Creek* mine, and the *Widger's* property near Ione. The new firm, with registered offices in Tacoma, and local mine office at Colville, plans to start development work at one of the properties this fall.

A \$10,200 tungsten exploration project approved by the DMEA is under way at the Stevens County, Washington property of *Big O Tungsten Mine, Inc.* The government loan will amount to \$7650. The six-month contract calls for 300 feet of drifting, crosscutting and raising, and 200 feet of timbering. Work will be between No. 1 adit level and the 3 level. The former *Deer Lake* tungsten property is on the north side of Blue Grouse Mountain, 10 miles north of Deer Park. William M. Quigley of Seattle is company president.

Gold and silver values were disclosed by A. C. Perrott of Portland, Oregon in drifting for annual assessment work on his *Stemwinder* group of four mining claims in the Taroda mining district, 15 miles northwest of Republic, Ferry County, Washington.

Kaiser Aluminum and Chemical Corporation's Trentwood rolling mill in the Spokane Valley of Washington has installed the world's largest aluminum stretcher. Hydraulically operated jaws stretch aluminum alloy plate to remove stress buckles resulting from rolling and heat treatment. The stretcher is 81 feet long, 18 feet wide, and weighs 275 tons.

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Big Indian Mines Drills On Maimie Uranium Claim

Big Indian Mines, Inc., has drilled 20 holes on its property and found mineralization, varying in thickness with composites assays of the cores from 0.13 to 0.22 percent uranium oxide. Bands or stringers assayed 0.40 to 0.50 percent uranium oxide. The property is about three miles north of the Ute Exploration Company's Mi Vida mine in San Juan County, Utah.

The average depth of the mineralization from the surface is 300 feet and several thousands of tons have been outlined in the core drilling operations.

U. S. Smelting, Hecla Sell Resurrection to Newmont

The Newmont Mining Corporation has paid \$1,000,000 for complete ownership of the Resurrection Mining Company's properties and plants in the Leadville district of Lake County, Colorado.

Newmont has always owned one-third of Resurrection, while United States Smelting, Refining and Mining Company and Hecla Mining Company each owned one-third also. United States Smelting and Hecla each received \$500,000 for their ownership.

Resurrection has been operating in the Leadville district since 1938 and presently is the largest claim holder in the famous Colorado camp. Among the mines it owns or leases are the Resurrection, Yak Tunnel, White Caps, Silver Cord, and Ibex. The portal of the United States Bureau of Mines Leadville Drainage Tunnel is located on ground also controlled by Resurrection.

In addition to mining claims, Resurrection has an 800-ton-per-day differential lead-zinc flotation mill and complete mine and repair shop facilities at the portal of the Yak Tunnel.

In 1952, Resurrection was Colorado's largest lead mine and second largest zinc mine. It ranked third as a gold and silver producer. All company ore production has recently been discontinued and large areas adjacent to the Yak Tunnel leased to individuals. The company has been carrying on an exploration program in Iowa Gulch and operating the mill at a drastically reduced rate treating leasee ores and custom ores. Resurrection is the largest base metal custom milling company in Colorado.

AEC Lists Locations of Radioassay Test Units

The United States Atomic Energy Commission has released the list of locations where radioassay units are testing for radioactivity. The facilities are used only for such samples as the facilities would be handling in their regular operations and not for testing samples submitted by the public solely for this purpose. The following is a list of the 28 installations:

The American Smelting and Refining Company at Selby, California; at Leadville, Colorado; East Helena, Montana; Deming, New Mexico; El Paso, Texas; Salt Lake City, Utah; and Tacoma, Washington; Combined Metals Reduction Company at Pioche, Nevada and Salt Lake City, Utah; Hawley & Hawley, Douglas, Arizona; Edward Eisenhauer, Jr., Los Angeles, California; Abbot A. Hands, San Francisco, California; Smith-Emery Company, Los Angeles, California; Golden Cycle Corporation, Victor, Colorado; Charles O. Parker and Company, Denver, Colorado; Carpo Engineering & Manufacturing, Jacksonville, Florida; Bunker Hill & Sullivan Mining and Concentrating Company, Kellogg, Idaho; Day Mines, Wallace, Idaho; Peter Mack, P. O. Box 808, Wallace, Idaho.

Bruce Williams, Joplin, Missouri; Kennecott Copper Company, McGill, Nevada; Ledoux & Company, Teaneck, New Jersey; Allied Chemical & Dye Corporation, Deming, New Mexico; Shattuck Denn Mining Corporation, Albuquerque, New Mexico; Custom Assay, El Paso, Texas; International Smelting and Refining Company, Salt Lake City, Utah; Union Assay Office, Salt Lake City, Utah; and Howe Sound Company, Holden, Washington.



The Climax Uranium Company is diamond drilling for uranium-vanadium ore on its Mineral Joe group of claims in West Paradox, Montrose County, Colorado. Percussion drilling has met with some success to depths of 300 feet but has been abandoned due to faulted and broken formations unsuitable for this type of drilling. Marvin L. Kay of Grand Junction, Colorado is vice president and general manager of the company. J. E. Weston is superintendent of mining.

The Resurrection Mining Company has completed its summer exploration program at Summitville, Del Norte County, Colorado. Reopening of certain underground workings was accomplished as well as diamond drilling. John Livermore, who was in charge at Summitville, has been transferred to Newmont Exploration Company Limited's Tombstone, Arizona operations.

Prothero and Boardman, contracting firm of Provo, Utah, is constructing a new repair and maintenance shop at the United States Atomic Energy Commission's headquarters at Grand Junction, Colorado. The shops will provide new facilities for repair and maintenance work which has increased under the commission's expanding program for procurement of domestic raw materials. Walker-Lyburger Construction Company, contractor for the AEC, received the over-all bids for the job.

In western San Miguel County, Colorado the Sprague and Henwood Company's drilling crew has moved from Slick Rock to Gypsum Valley. Neilson and Larson have moved their drilling outfit from Bishop Canyon back to their lease at the top of Slick Rock Hill. Robert Fay has gone to Naturita, Colorado to do contract work. He has leased the Strawberry Roan mine from the Vanadium Corporation of America.

Rehabilitation of old houses at Pandora and Liberty Bell, Colorado, and building of eight new houses at Telluride, Colorado, is being done by Telluride Mines, Inc., of Telluride. The company is owned by Idarado Mining Company which in turn is controlled by Newmont Mining Company. Telluride is working out a new method of holding mill tailing so it will be unnecessary for men to work on the tailing pond. Also, when the new method is used, there will be less danger of tailing escaping down the river.

A new uranium find has been reported in the John Brown Canon area, west of Gateway, Mesa County, Colorado. The deposit, which was discovered by United States Geological Survey drilling, is on property reportedly controlled by the Gateway Mining and Development Company.

Production at the Wellington lead-zinc mine near Breckenridge, Colorado for one week in September was about the same as that for the entire month last year. More than 350 tons of ore were shipped to the Resurrection Mining Company's mill at Leadville, the United States Smelting, Mining and Refining Company's mill at Midvale, Utah and the International Smelting and Refining Company's mill at Tooele, Utah. W. L. Davenport, lessee and operator of the mine, reports that new rails and a larger tunnel to handle larger cars will be completed in several months. Then a vertical winze will be sunk from the north workings of the main level.

Gold Range, Inc., a recently organized mining company, has disclosed a discovery of gold-bearing ore a mile north of Ward, Colorado. Paul Elam of Denver, Colorado, president of the company made the report. Gold Range has acquired rights to re-open two famous old mines in the Ward area; the Blackjack, a silver producer; and the New Market, a former high-grade gold producer. The new mine, the Comstock, adjoins the New Market. The corporation disclosed that it has acquired a mill in Ward to process ore from the mines. When the three mines are in full production, a second mill may be purchased.

According to John Deeksen, president of the Front Range Mines, Inc., the company's Mattie mill in Clear Creek County, Colorado which is operated on a custom basis, will net the company more than \$100.00 per day. The company is mining over 400 tons of gold ore per month at its Strong mine at Cripple Creek, Colorado and it is expected that a night shift, to be added soon, will double production. Mill settlements have run from \$17.00

per ton to over \$124.00 per ton and currently average between \$50.00 and \$80.00 per ton. Mr. Deeksen has stated that here are about 11,000 tons of broken ore in the mine plus an available 30,000 tons additional ore not yet mined.

Vanadium Corporation of America's uranium-vanadium processing mill at Durango, Colorado has produced more uranium concentrates during a 30-day period than any other mill in the United States, according to the United States Atomic Energy Commission. VCA recently obtained approval from the AEC to install an additional roaster in the mill which processes ores from Utah, Colorado, and Arizona.

The *Venture Leasing Company*, a partnership composed of William Gianetto, Leslie Larson, and John Cook, all of Silverton, Colorado, is operating its 50-ton-per-day differential flotation mill treating base metal sulphides from the firm's leased *Gold Prince* mine. Shipments of good grade concentrate have been made to a Utah smelter. Construction of the mill was started last year in an area leased from the *United States Smelting, Mining and Refining Company*.

United States Atomic Energy Commission geologists have been checking all mine openings in the San Juan Mountains in their search for uranium mineralization. Reports indicated that prospecting with Geiger counters failed to disclose anything of interest in San Juan County mines. However, a cross vein cutting the lead-zinc-silver-gold Mickey Breen vein in the *Mickey Breen* mine above Bear Creek Falls, Ouray County, showed definite radioactivity. Further checking and assaying is underway.

The Colorado State Mineral Resources Board has been surveying some 55,000 mining claims in the state in order to determine why less than 10 percent of them are active producers. Claim owners have received questionnaires asking why they are keeping taxes and assessment work up to date and what recommendations they might have for improving the mining industry. According to Robert S. Palmer, board secretary, the aim of the survey is to provide the federal government with a plan of action for the industry.

Climax Molybdenum Company of Climax, Colorado is installing a \$100,000 television pickup system which will carry all Denver, Colorado television channels into Climax. Twin relay towers are being installed on top of the 13,750-foot McNamee peak at Climax. The entire community is being cabled for television. More than 11,000 feet of coaxial cable will lead down from the two mountain airdials in a trench and then 800 feet underground through 1,100 feet of the upper level of the *Climax* mine. It will then run along 2,000 feet of mine tunnel before returning to the surface. A power cable parallels the TV cable, supplying current for amplifiers and controls.



The *Salt Lake Tungsten Company's* refinery at Salt Lake City, Utah, is now in operation. It is estimated that residues (30,000 tons) left from a wartime govern-

ment refinery in Salt Lake City, will keep the plant in operation on a three-shift basis for 10 months. This re-refined product is an "artificial" calcium tungstate of a grade acceptable for government purchase. The concentrates are repulped with soda ash from Green River, Wyoming mines, and material goes to reactor units to be placed under steam pressure of 200 pounds per square inch. Molybdenum precipitate, product of the third step in the process, will be stockpiled for future reduction. Synthetic scheelite (calcium tungstate) is then precipitated. This is dried, packed, and shipped to the General Services Administration for its stockpile. A new feature in the plant is a filter developed by Blair Burwell of Grand Junction, Colorado, president of the *Minerals Engineering Company*, which permits quick discharging and thorough washing of materials. The Burwell filter is credited with recovery of 96 percent of the tungsten values in concentrates at the Salt Lake plant. *H. M. & S. Milling Company* of Salt Lake City is operating 24 hours a day to supply additional concentrate to the refinery. Other concentrate will come from the Glenn, Montana mill now being constructed by *Minerals Engineering Company*. For further details, see the September, 1953, issue of *MINING WORLD*, p. 104.

Two diamond core rigs are drilling holes to a depth of 200 to 300 feet on a uranium prospect at Lisbon Anticline, San Juan County, Utah, on property of the *New Park Mining Company*. *Mack Drilling Company* has the contract for the work as now projected. A third rig may shortly be available. Drilling locations are selected on the basis of a nucleometer survey, including grid analysis of intensities of radiation. New Park has more than 25 claims in addition to the lease at Lisbon Ridge which is on the eastern fringe of the Big Indian district. The company is reportedly planning a 700-foot diamond core prospect at its holdings in the Grandview area of San

Juan County. Mr. W. H. H. Crammer, president of New Park, also heads *Oil, Inc.*, and the *East Utah Mining Company*.

Lynn Burr and Ronald James of Marysville, Utah are said to have made a surface discovery of silver-copper-gold ores about four miles northwest of Marysville, Utah.

La Sal Mining and Development Company has been incorporated under the laws of the state of Utah to develop the 59 claims of T. C. Hudson and Frank Richardson and two school sections which adjoin the property of the *Utex Exploration Company* near Moab, Utah. Core drilling has already started on the La Sal property and will be continued with a new and larger dry-rig. Officers of the new company are H. H. Mundy, president; Mr. Richardson, vice president; and Mr. Hudson, secretary-treasurer.

Charter changes of the *Utex Exploration Company* with headquarters in Moab, Utah, will facilitate plans for construction of a multi-million dollar mill at Moab, according to Charles A. Stern, chief geologist. *Utex* has been assigned a wave length and granted a license by the Federal Communications Commission and has installed four short wave radios to provide contact with outlying drill rigs and with the camp. The four mobile units have been installed—one in the station wagon of the Moab Drilling Company, two on drill rigs, and one at the camp on the Big Indian claim. A larger, more powerful unit is being installed at the new offices of the company and other units will be added as needed.

Research is underway at *Kennecott Copper Corporation's* temporary laboratory on the University of Utah campus to study helpful bacteria which aid in leaching mine dumps. Scientists are studying the part these bacteria play in current copper production and their possibilities for the future when the dumps of mine waste and very low-grade ores



Denver Post Photograph

PRESIDENT TALKS WITH URANIUM MINERS

United States President DWIGHT D. EISENHOWER is shown at his "temporary White House" desk in Denver, Colorado, with western uranium miners who asked the president for a voice for ore producers in United States Atomic Energy Commission production policies. Standing from left to right are BOYD OLIVER of Norwood, Colorado; R. E. WILLIAMS of Norwood; K. N. GARRAD of Window Rock, Arizona; SAM AKEAH of Window Rock; KATO SELLS of Farmington, New Mexico; STEPHEN L. R. McNICHOLS of Denver, Colorado; T. H. SKIDMORE of Dove Creek, Colorado; and D. L. WILLIAMS of Norwood, Colorado.

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The United States Atomic Energy Commission has requested bids covering a minimum of 20,000 feet and a maximum of 30,000 feet of core and noncore drilling to be performed in the Carlie District of Cook County, Wyoming. The successful bidder must provide three complete units for surface drilling.

The American Uranium Company, with holdings in northern Converse and southern Campbell counties, has begun extensive mining operations. If operations are successful, a buying station may be established at Douglas, Wyoming where the company has its headquarters.

Ignatz Piki, a Lincoln County, Wyoming prospector, has reported the discovery of a manganese-bearing vein in the Kemmerer area of Wyoming. Mr. Piki has received a report from the Natural Resources Institute at Laramie stating a sample of ore assayed 21.65 percent manganese.

Extensive exploratory operations on deposits of titaniferous magnetite are being conducted at Iron Mountain 35 miles northwest of Cheyenne, Wyoming by the Union Pacific Railroad. A mining camp is being established at Iron Mountain and the company is setting up a petroleum and mining district office in Laramie. The project includes exploration of approximately 50 square miles and is expected to last two years.

Statement of Ownership

Statement required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management and circulation of Mining World published monthly except in April when publication is semi-monthly at Bristol, Connecticut for October 1, 1953.

1. The names and addresses of the publisher, editor, managing editor and business managers are: Publisher, Miller Freeman, 121 Second Street, San Francisco 5, California; Editor, George O. Argall, Jr., 121 Second Street, San Francisco 5, California; Managing Editor, None; General Manager, Wm. B. Freeman, 121 Second Street, San Francisco 5, California; Business Manager, Max F. Holsinger, 121 Second Street, San Francisco 5, California.

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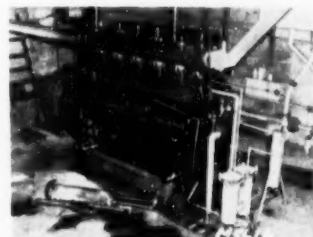
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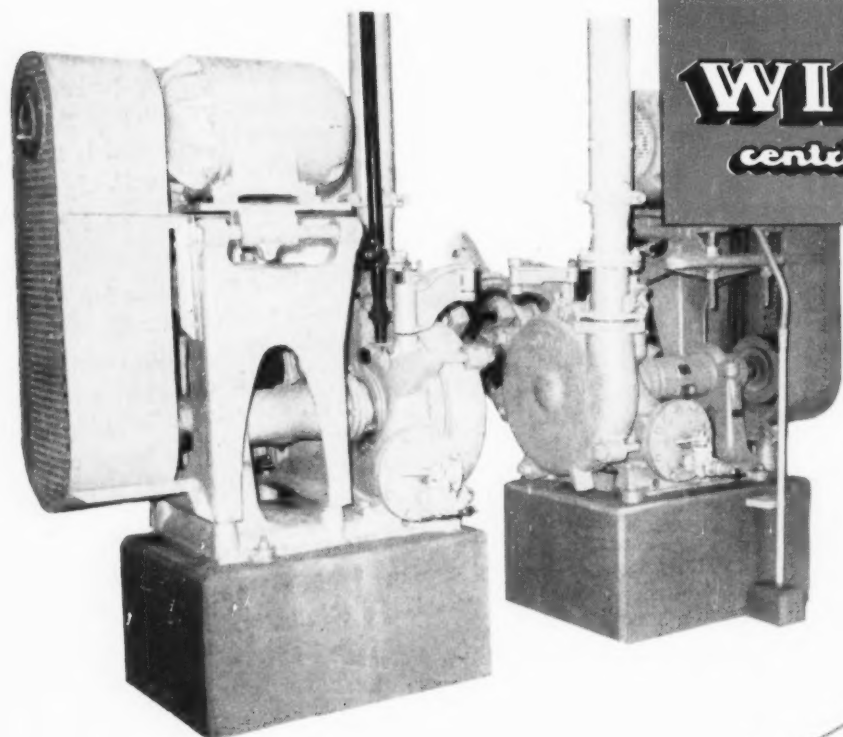
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